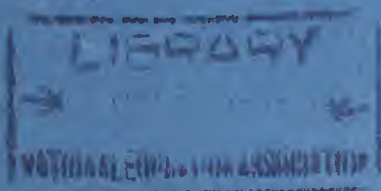


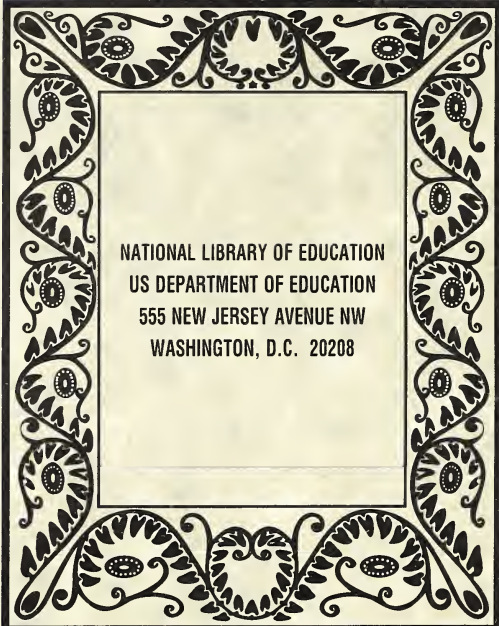
**ANNUAL REPORT
OF THE
SECRETARY
OF THE INTERIOR**



**FOR THE FISCAL YEAR ENDED
JUNE 30**

1938





NATIONAL LIBRARY OF EDUCATION
US DEPARTMENT OF EDUCATION
555 NEW JERSEY AVENUE NW
WASHINGTON, D.C. 20208

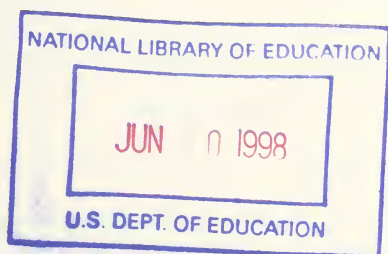
ANNUAL REPORT
OF THE
SECRETARY
OF THE INTERIOR



FOR THE FISCAL YEAR ENDED JUNE 30

1938

UNITED STATES GOVERNMENT PRINTING OFFICE
WASHINGTON : 1938



UNITED STATES DEPARTMENT OF THE INTERIOR

Harold L. Ickes, Secretary

For sale by the
Superintendent of Documents, Washington, D. C.
Price 50 cents



OCLC# 10606268

L 111 .A322 1938

United States. Dept. of the
Interior.

Annual report of the
Secretary of the Interior

CONTENTS

REPORT BY BUREAUS AND DIVISIONS

	Page
Letter of Transmittal	v
The National Park Service	1
Bureau of Reclamation	51
The Bonneville Project	84
General Land Office	87
Division of Grazing	107
Director of Forests	122
Geological Survey.	125
Bureau of Mines	173
Office of Indian Affairs	209
Office of the Solicitor	264
War Minerals Relief Commission	270
Division of Territories and Island Possessions	273
Puerto Rico Reconstruction Administration	281
Office of Education	294
Division of Investigations	357
Petroleum Conservation Division	360
Division of Information	366
Division of Motion Pictures	367
Office of Exhibits	368
Office of the Adviser on Negro Affairs	369
Board on Geographical Names	371
St. Elizabeths Hospital	373
Howard University	395
Freedmen's Hospital	415
Columbia Institution for the Deaf	417

ILLUSTRATIONS

Frontispiece, Olympic National Park, Wash- ton.	facing page	v
Kings River, California, a proposed national park .	facing page	1
Onions harvested on Owyhee reclamation project, Oregon	facing page	51
Lettuce grown on Salt River reclamation project .	facing page	51
The All-American Canal	facing page	56
Air view of Bonneville Dam	facing page	84
A chart of the Bonneville project	page	85

Measuring cable over the Columbia River. . . .	facing page	125
Potash mine near Carlsbad, N. Mex.	facing page	125
Helium tank car	facing page	173
New Bureau of Mines buildings, Oklahoma, Mary-		
land, and Alabama	facing page	194
Pueblo bowl makers	facing page	209
New and old in Indian housing	facing page	231
Puerto Rico, low cost housing	facing page	281
A cement plant built by P. R. R. A.	facing page	281



VIEW OF THE NEWLY ESTABLISHED OLYMPIC NATIONAL PARK IN
THE STATE OF WASHINGTON.

THE SECRETARY OF THE INTERIOR

WASHINGTON

MY DEAR MR. PRESIDENT:

Encouraging progress in our campaign of the past 5 years to conserve the vast store of the natural resources of the United States is the keynote of the reports of the bureaus and agencies of the Department of the Interior for the fiscal year ended June 30, 1938, which are transmitted herewith.

I said last year that our citizens were in agreement with the principle that prudently managed national resources could be made to produce a far higher standard of living for the Nation over a longer period. They have also shown their willingness to support intelligent and energetic action on the part of the Government to this end.

I am gratified to be able to report that, with the passing of another year, it is becoming more evident that the people are demonstrating a greater interest in conservation; are beginning to heed our warnings that, although our resources are bountiful, they are not limitless. From the accompanying reports of the bureaus and divisions of the Department, most of which deal with some important phase of conservation, and as a result of my own first-hand observations and information, I believe that a great advance in sentiment for conservation has been made during the past year.

A court victory for the Government in the Elk Hills oil case wherein the United States sought to be declared the owner of valuable mineral lands; the establishment of the Olympic National Park in Washington as the result of legislation passed during the closing hours of the Seventy-fifth Congress; the salvage of the old Chesapeake and Ohio Canal between Washington, D. C., and Cumberland, Md., for recreational purposes; and the pending purchase by the Government of important sugar-pine groves adjacent to the Yosemite National Park in California stand out as major triumphs on the side of true conservation.

ACCOMPLISHMENTS DURING THE YEAR

It is not possible for me in a letter of transmittal to touch upon all of the many activities and accomplishments of the Department during the past fiscal year, but I shall mention some of them.

The construction program of the Bureau of Reclamation, with work in progress on 32 projects in 12 States, was the largest in history.

The base of the massive Grand Coulee Dam on the Columbia River was completed on March 21, 1938, a year ahead of schedule, and, at the close of the fiscal year, work was about to commence on Shasta Dam, the second largest concrete dam in the world and one of the key structures of the Central Valley of California project.

An act of Congress, approved August 20, 1937, set up a Bonneville Authority for the purpose of supervising and selling the electric energy generated at Bonneville Dam on the Columbia River. Mr. J. D. Ross was appointed Administrator under this act, and for the first time the Administrator's report is included in the annual report of the Secretary of the Interior.

In addition to the creation of the Olympic National Park and the successful fight to save in California one of the finest remaining sugar pine stands in the world, progress was made in the development of the Isle Royale National Park project in Michigan and in the Blue Ridge and Natchez Trace Parkway projects. An appropriation of nearly \$750,000 made possible the purchase of lands to be included within the boundaries of the Great Smoky Mountains National Park. Three new national monuments were added to the parks and monuments and additions were made to several of our national parks.

Visitors to the units of the national park system mounted to 16,233,688—a new all-time record.

For the second successive year the operations of the General Land Office resulted in a return to the Federal Treasury of 5 dollars for each dollar expended for administration. For the first time, all of the principal regulations, based upon more than 5,000 laws, have been brought together in up-to-date form and made available for general use.

The control of grazing and the regulated use of the public range has been carried forward with a harmony of purpose between the stockmen and the administration. Advancement of this sound conservation policy is shown by the fact that during the coming year, preliminary work will have been completed and temporary 1-year licenses replaced by term permits of not more than 10 years' duration in 1 grazing district in each of the 10 States affected.

From 130,000,000 acres in 1887, Indian lands were reduced to 49,000,000 acres in 1933. At the close of the last fiscal year Indian lands increased to approximately 51,540,307 acres of which 67 percent were tribally owned and 33 percent in trust allotments.

Taking advantage of the Indian Reorganization Act of 1934, which gave to the Indians, at their own option, larger responsibilities of self government, there were 82 tribes operating under constitutions and bylaws. Of this number 57 tribes had become incorporated under Federal charters.

Because the Department is charged by law with the conservation and management of large forest areas there was created, on May 18, 1938, the Office of Director of Forests for the purpose of promoting a unified and coordinated conservation policy with respect to these lands.

There was also set up within the Office of the Secretary a Division of Information, similar to organizations already existing in other Federal departments and agencies, for the purpose of disseminating to the public official information concerning the work and policies of the Department.

The Office of Education reported more than 6,000,000 students now enrolled in the 4 years of the public high schools and approximately 1,500,000 persons in night and part-time schools. Gratifying progress was reported by schools, colleges, and universities in the

teaching of conservation in its broadest meaning. Educational radio and forum demonstration projects were continued and extended.

In spite of liberal allotments of loans and grants from Public Works Administration and other emergency funds for new school construction, a survey made by the Office of Education showed a continuing shortage of school building construction.

THE ELK HILLS OIL CASE

Regulations were issued to protect from private exploitation the Nation's petroleum resources in the Teapot Dome, Wyo.; the Elk Hills, Calif., and all other portions of the approximately 70,000 acres of naval petroleum and Government helium reserves.

This was part of the Department's intensive program which has been carried on during the past 5 years to preserve these valuable deposits of oil and helium for the Nation's use and followed closely upon the finding of a Federal district court declaring section 36 in the Elk Hills to be Government property. This court decree upheld the original decision made by the Secretary of the Interior on January 24, 1935, declaring the title to these valuable mineral lands in the United States. The Department has made a similar finding with respect to section 16 in the same area.

The Solicitor of the Department of the Interior and his staff advised and conferred with special counsel for the Government in the Elk Hills oil case (*U. S. v. Standard Oil Co. of California*, et al.).

The Solicitor's Office also was engaged in the preparation and trial of the Government's case against the city and county of San Francisco to enjoin the continued violation of section 6 of the Raker Act. This suit likewise was decided in favor of the United States by the district court of the United States.

OLYMPIC NATIONAL PARK

The creation of the Olympic National Park in the State of Washington, assures the preservation of a fragment of the Pacific coast rain forest with its magnificent Douglas fir, Sitka spruce, western hemlock, and giant cedar. The largest remaining herds of the rare Roosevelt elk are also finding a refuge in this park.

On the Olympic peninsula cedar trees are standing that are 45 feet in circumference, trees from which Indian women stripped inner bark for clothing a hundred years before Columbus discovered America. In this new park there are Douglas fir 40 feet in circumference and a thousand years old.

The reservation of this area is not exclusive of or inconsistent with the right of the lumber industry to a proper and legitimate exploitation of the timber resources of this area. The manufacture of lumber is necessary to our prosperity and well being as a Nation. There is room on the Olympic Peninsula for forests for both the people and the sawmill. Assuming that the self-interest of the lumbermen is an intelligent one, we have a right to look forward to the end that this wonderful section may be put to the wisest and best use for all concerned.

Selfishness and commercialism at any cost met defeat in the closing days of the last Congress when the President was empowered to de-

termine the final boundaries of this new national park. The President's approval of the measure on June 29, 1938, fulfilled the dream of conservationists for a third of a century. It is interesting to note that the effort to create this great national park dates from the administration of President Theodore Roosevelt, who was personally interested in this area.

MORE SUGAR PINES ARE SAVED

Several years ago John D. Rockefeller, Jr., happened to be visiting the Yosemite National Park when the lumbermen's ax was being sharpened to destroy a magnificent grove of sugar pines. Mr. Rockefeller contributed \$1,644,927.12 for the purchase of this grove, his donation being matched by Federal funds. This grove is now one of the outstanding features of Yosemite. Additional thousands of acres of the dwindling supply of this rare giant will be saved from destruction under the authority conferred upon the Secretary of the Interior by H. R. 5394; S. 1791. This act authorizes the Secretary of the Interior, through the National Park Service, to acquire the Carl Inn tract of 7,730 acres of sugar pines bordering the western boundary of Yosemite National Park, Calif., as an addition to the park. The Deficiency Act of August 25, 1937, carried an appropriation of \$2,005,000 for the purchase of these trees; \$5,000 was for administration costs.

This is one of the finest sugar pine stands in the world. The act of Congress came just in time to stop the lumbermen at the edge of this grove, thus saving these exceptional trees for future generations.

Sugar-pine trees, which are rare and becoming rarer because of their value for lumber, are among the finest manifestations of Nature and rank in a class with the spectacular western redwoods. The sugar pine is a giant among trees, growing as it does to a height of 240 feet and measuring 8 or 9 feet in diameter. It grows only in California and Oregon in majestic groves and of straight, towering trees that give the impression of trying to reach to the sky.

The Department of the Interior will avail itself to the fullest possible extent of the powers granted under this legislation, which, to our way of thinking, represents a generous spirit and a cultivated imagination on the part of Congress. We are delighted at this opportunity to assist the Congress and the President in giving the country a valuable object lesson in conservation by saving these trees from the destruction that threatened them.

To my mind, it would have been little short of a crime for the country to have permitted these forest giants to be felled. So many such treasures of the Nation have already been despoiled that in years to come those who will follow us will rejoice that these sugar pines have been preserved for them.

Of the 7,730 acres to be acquired under the act of Congress, 7,172 are owned by a private lumber company which was preparing to turn the two and three centuries old trees into lumber, leaving only the desolate, sheared-off stumps and broken tops as a memorial to an outraged Nature despoiled of its beauty. This privately owned area will be acquired through condemnation proceedings if the negotiations that are now under way fail to arrive at a price which seems reasonable to the Government. Approximately 500 acres are in a national forest

and under the terms of the act will automatically become a part of the park when the private holdings are acquired.

The Department of the Interior for many years has sought to preserve this forest, in conformity with the policy of the National Park Service to save for future generations outstanding examples of America's flora, scenic and recreational areas by protecting them from commercial exploitation.

ADDITIONS TO THE PARK SYSTEM

Three new national monuments were added to the park system. They are the Capitol Reef National Monument in Utah, Pipestone National Monument in Minnesota, and the Channel Islands National Monument in California.

The boundaries of Hawaii National Park were extended and the Hot Springs National Park was enlarged. The Salem Maritime National Historic Site was established.

The Senate Committee on Public Lands was authorized to investigate the suitability and feasibility of extending the Grand Teton National Park in Wyoming by including the Jackson Hole country and an area in the Teton National Forest which surrounds Jackson Lake. The Senate also directed an inquiry to determine the suitability of enlarging the Petrified Forest National Monument in Arizona into a national park.

During the year the Park Service investigated 24 new areas for possible inclusion in the Federal park system.

Additions to the Nation's parks during the year brought the number of areas to 144 and the total acreage to 19,187,933.

As a result of the continued Historic American Buildings Survey, information is now available on more than 7,000 early American buildings.

Winter sports enjoyed a phenomenal growth and popularity throughout the national parks during the winter of 1937-38 and advisory committees on camping, hiking, and skiing were appointed.

Serious thought has been given to the problem of providing recreation for the heavy Negro population of the deep South.

The number of forest fires reported in the western national parks was the lowest since 1930.

With a total staff of 125 naturalists, the Park Service contacted 4,500,000 visitors through lectures and nature trips in the parks during the year. Dioramas, photographs, paintings, and models were displayed at 15 expositions.

Over 3,000,000 seedlings, obtained from the Soil Conservation Service, were planted in recreational demonstration areas for the purpose of assist ng in erosion control or to reforest cut-over or burned-over lands.

A comparison of the concession service in the national parks during the last year with 10 years ago shows an interesting trend. Before the 1929 depression substantially all the profits of the park operators were earned from sightseeing transportation and first-class American-plan hotel accommodations. Today the profit-producing facilities are the low-priced cabin accommodations, cafeterias, coffee shops, and grills. Although the transportation and first-class hotel accommodations still furnish the greater portion of the operator's revenues,

they are not so self-supporting as the newer types of accommodations.

As of June 30, 1938, there were 140 corporations, firms, and individuals under contract or permit to furnish accommodations to the public as compared with 131 as of the beginning of that fiscal year and 89 as of 10 years earlier.

The furnishing of accommodations to park visitors through private corporations and individuals in many instances has not worked out satisfactorily. There is an element of inconsistency in permitting concessionaires to operate on Government property. It is hoped that the Congress will give serious consideration to this problem with a view to adopting a policy that will be for the best interest of the Government and of the public.

The Federal Park System now comprises 27 national parks, 73 national monuments, 11 national military parks, 11 national cemeteries, 8 national battlefield sites, 8 national memorials, 1 national recreational area, 1 national historical site, 1 national parkway, 3 national parkway projects, 2 national historic parks, and the National Capital Parks unit. The net increase in the Nation's park and monument system through the adjustment of the boundaries of existing areas and through lands acquired amounted to 1,846,377.363 acres.

At the close of the fiscal year the National Park Service was responsible for the maintenance and operation of 21,122,615 square feet of floor space in the District of Columbia. Of this total 18,303,567 square feet were in 46 Government-owned buildings and 2,891,048 square feet in 64 privately owned buildings.

RECLAMATION

Demand from many sources, including those of refugees from drought areas, for farmsteads on Federal reclamation projects continued very high during the year. For 69 farm units opened for homestead on the Klamath project in northern California, 1,280 formal applications were filed.

On 35 operating projects in 16 semiarid Western States water was provided by federally constructed works for the irrigation of 3,034,769 acres of former desert lands. The crops harvested from these areas had an average value of \$39.09 per acre. The water supply for the projects was ample, with one exception during the 1937 irrigation year, and at the outset of the 1938 season the prospects were bright for a very good water year.

During the year the Repayment Commission, created by the act of August 21, 1937, recommended and the Secretary granted an extension of time in the payment by project water users of \$300,331 due under repayment contracts. This sum represented approximately one-tenth of that due during the year. The Repayment Commission also drafted its report on Federal and Indian reclamation projects, and this was transmitted to the Congress.

The appropriation act for the Department for 1939 marked a step forward in the matter of new support for the Reclamation fund. This act provided for an immediate increase in the Reclamation fund and carried a clause setting up a new source of accretions to the fund which will, in part, replace the dwindling revenues from the sale of public lands.

Work was in progress on 32 projects in 12 States under the largest Reclamation construction program in history. Thirteen major dams were being built in western stream beds, two having been started during the year. Six dams were completed during the year, bringing to a grand total of 147 the number of dams constructed by the Bureau of Reclamation since it began operations.

The base of Grand Coulee Dam was completed, and a new contract was awarded for the completion of the dam to its full height of 550 feet. This contract alone involves the placing of 5,809,500 cubic yards of concrete.

Large-scale construction was started on the Central Valley project in California. Problems preliminary to the commencement of work in most branches of this wide-flung undertaking were solved. Bids were opened before the close of the year for the building of Shasta Dam, the key structure of the project.

Additional generating units were installed in the Boulder Dam power plant. Energy was delivered continuously throughout the year to Los Angeles and other municipalities from the Boulder powerhouse. A total of 1,427,928,442 kilowatt-hours of energy was sold for a gross revenue of \$1,888,132.84. Work progressed rapidly on the All-American Canal, where all the principal structures were under construction.

The President approved, on December 21, 1937, the finding of feasibility, and thereby cleared the way for the commencement of construction of the Colorado-Big Thompson project in Colorado, the most important of the new projects.

BUREAU OF MINES

Too often sight is lost of the achievements of our purely scientific organizations—the Bureau of Mines and the Geological Survey.

The Bureau of Mines has continued its dual program of mineral and human conservation.

The accident rate in mining has been much lower during the past 5 years than in any other period for which statistics are available. The excellent safety records of numerous mining companies working under hazardous conditions show definitely that mine accidents in this country can be reduced at least 75 percent if proven practices are followed strictly.

By the beginning of the new fiscal year the Bureau of Mines had trained 1,146,854 persons in safety courses.

The Bureau has devised and patented a process for producing 99.7 percent pure manganese metal from low-grade domestic ores and has conducted tests on a variety of American clays to determine whether they can be used for wares as attractive and sturdy as expensive, imported ceramics.

The Bureau of Mines also has pioneered in conducting tests on coal hydrogenation, a process already applied in England, Germany, and Japan for obtaining oil from coal. By the time that our oil fields approach depletion (and I have been insisting for years that unless our oil producers are more careful this day is rapidly approaching), it is hoped that motor fuel from other sources can be supplied so efficiently and cheaply that the transfer can be made without drastic economic adjustment.

Experts in the Bureau have been giving their special attention to the strategic minerals that are vital to industry and indispensable in war.

The Director of the Bureau of Mines reports that a factor which contributes to the waste of our mineral resources is unrestrained production that results in stock piles that frequently deteriorate before they are used. A way would be open to enable the Government to check this overproduction if we could determine the Nation's requirements of the principal minerals. I am in favor of legislation which will permit this Department to make this determination in the interests of national defense as well as in the interests of conservation of natural resources.

Through funds made available by the Public Works Administration the Bureau of Mines has increased its facilities by the construction of the southern experiment station at Tuscaloosa, Ala., the eastern experiment station at College Park, Md., and a new laboratory at the petroleum station at Bartlesville, Okla.

HELIUM

The Government's helium plant at Amarillo, Tex., produced 6,100,000 cubic feet of helium during the fiscal year of 1938, an increase of 1,300,000 cubic feet over the previous year, mainly for the use by the Army and Navy in nonrigid airships. This production was only about one-third of the quantity which a foreign nation desired under the terms of the amended helium act permitting export under certain conditions. No helium was exported because the Secretary of the Interior was not persuaded that the supply sought was not of military importance under the provisions of the act.

The Government acquired during the year certain private helium-bearing lands in accordance with the amended helium act. This gives to the United States a virtual monopoly of the world's helium supply. Helium was supplied to the United States Public Health Service for medical studies, the Bureau of Standards for research and the Weather Bureau for the inflation of small meteorological balloons. The Weather Bureau has requested 450,000 cubic feet of helium for this purpose during the next fiscal year. Approximately 70,000 cubic feet of the gas were delivered during the year for medicinal and scientific purposes, and helium-oxygen mixtures for the treatment of respiratory diseases are now available in all parts of the country.

GEOLOGICAL SURVEY

The Geological Survey sent out 63 geologic parties in 35 States and Alaska during the year. Flood studies were continued and measurements of stream flow were maintained at 3,831 stream-gaging stations.

Mineral production from public and Indian lands and the naval oil petroleum reserves under the supervision of the Survey had an estimated value of \$88,500,000. The revenues accruing therefrom amounted to about \$9,750,000.

The piercing eye of the X-ray machine was used more than ever before by Survey scientists last year to reveal secrets which might lead to the advancement of the conservation of natural resources. The Director of the Survey reports that it is now possible to show that

the physical properties of a mineral depend not only upon the kinds of atoms composing it, but also upon their role and arrangement in the crystal—features that can be determined by X-rays. The densities of strata, rocks, and minerals likewise, in the final analysis, are determined in the same way. It seems reasonable to expect that further study of the associations and conditions of the formation of minerals will yield illuminating correlations with both their chemical composition and physical structure.

The work of the Geological Survey during the year was basically important in the general program of conservation and there is included in the Director's report a State-by-State recital of its operations. Special investigations included a study of the base exchange properties of river clays, which are expected to afford a correction of the previously calculated age of the ocean.

A temperature survey was made of a 7,000-foot well near Washington, Pa.

Of the total area of the United States, 45 percent has been covered by topographic maps, the year's increment amounting to 0.02 percent. The reduced percentage, as compared with 47.4 percent reported in 1937, is due to the fact that during the year maps of 79,668 square miles, based on reconnaissance surveys prior to 1896 and considered inadequate, have been withdrawn from distribution and the areas declared to be unmapped.

The production of petroleum from public lands in 1938 was substantially greater than in other recent years; the production of gas was approximately the same as in 1937; the production of natural gasoline was substantially less than in other recent years. The production from 519 wells on naval petroleum reserves No. 1 and No. 2 in California and No. 3 in Wyoming aggregated 4,238,533.36 barrels of petroleum, 2,395,996,000 cubic feet of natural gas, and 10,581,504 gallons of natural gasoline and had an aggregate royalty value of \$1,020,444.84.

INDIANS

Indians are now increasing at twice the rate of the population as a whole.

In 1887 the Indian had left only 130,000,000 acres. In 1933 these had been reduced to only 49,000,000 acres, most of it waste and desert land. At the end of the last fiscal year the Indian land area had been increased to approximately 51,540,307 acres; 67 percent of this was tribally owned and 33 percent was in trust allotments. During the last fiscal year 64,354.85 acres costing \$1,216,725.14 were purchased for Indian land. In addition, 38,279 acres of former Indian land which had been opened up to sale or entry were restored to tribal ownership or a reservation status.

From 1935 through the fiscal year 1938, 30 purchase projects have been conducted by the Commissioner of Indian Affairs in cooperation with the governmental agencies now merged in the Farm Security Administration. Options in the amount of \$3,521,057, covering 1,207,916 acres in 11 States, have been accepted, and purchases were completed to the extent of 94 percent. By Executive order, on January 18 and April 15, 1938, the President transferred jurisdiction of approximately 791,405 acres of these lands from the Department of Agriculture to the Department of the Interior.

The act of May 31, 1938, authorized the Secretary of the Interior to withdraw and reserve permanently tracts of land not to exceed 640 acres each of the Alaska public domain for schools, hospitals, and other purposes necessary to aid the Indians, Eskimos, and Aleuts.

Conservation, for the benefit not only of the Indian, but of the whole Nation, is, of course, the controlling policy in the administration of Indian grazing and forest lands. In no other field does the Government have such an opportunity to prove what can be done in the way of conservation and the proper land use as it does in the supervision by the Indian Service of the Indian domain. The Indian Service, by virtue of its position as guardian of Indian lands, can apply a concentrated knowledge and action directed to the problem. In the management of the Indian's forest resources, as in the management of the range lands, conservation is the watchword. Depletion of the timber supply is geared down to the rate of tree reproduction so that the Indians may enjoy their forest resources in perpetuity. It is estimated that 426,000,000 feet of timber were cut during the fiscal year 1938 from the 33,000,000,000 feet of timber on Indian lands. The gross income to the Indians from the sale of this timber was \$1,175,000.

The average Indian family of four had an income for the year 1937 amounting to approximately \$600. This figure includes earned and unearned income as well as nonmoney and money income.

During the past year the Indians Arts and Crafts Board initiated a number of policies, including a system of marking to prove the authenticity and quality of Navajo, Hopi, and Pueblo silver products and of Navajo textiles; the development of a home spinning industry in eastern Oklahoma with an organization of 75 spinners; and the formation of arts and crafts groups on three Dakota reservations. Survey work in Indian arts and crafts looking toward improved production has been carried on in North Dakota, Alaska, and North Carolina.

Indian boarding schools have decreased in number and day schools have greatly increased. In 10 years, the Indian day school population has risen from 4,532 to 14,087. Moreover, day schools have become popular in many instances with adult Indians, and there are cases where a larger number of adults than children have used the day school rooms. Improved practice in hygiene, sanitation, and soil conservation are being taught adults and accepted by the Indians. Community discussions of tribal affairs, extension demonstrations, and other community activities for the adult Indians are being developed through the day schools.

Under the Indian Reorganization Act since 1934, 82 tribes totaling 93,520 Indians were operating under constitutions and bylaws; and of these 57 tribes with a membership of 64,000 Indians have become incorporated under Federal charters. Under these constitutions and charters the Indians have an increasingly large sphere of self-government.

On July 1, 1937, there were authorized in the Indian field service and Alaska 6,933 permanent year-round positions. On April 30, 1938, there were 3,916 Indians employed in the Indian Service, of whom 3,627 were in regular year-round positions. Approximately one-half of the regular employees of the Indian Service are Indians. Slightly more than 40 percent of the Indians employed are full-bloods.

DIRECTOR OF FORESTS

The Office of Director of Forests was established May 18, 1938, to promote a unified policy of forest conservation on all of the lands under the jurisdiction of the Department of the Interior.

By law the Department of the Interior is charged with the conservation of a variety of forests and forest lands. These forests range from the primeval growths in the national parks, which are preserved for the inspiration and enjoyment of our own and future generations, to the intensive commercial development of the revested and reconveyed forest lands in Oregon.

Under the act of August 28, 1937, the Department of the Interior was given new and widened responsibilities for forest conservation over these Oregon lands. A basis was laid for a new type of cooperative conservation which, if successfully carried out, will provide a new approach to the practice of forestry in this country. It is my hope that this new approach shall be successful and for this and other reasons I have established the Office of the Director of Forests.

Not only did the act of August 28, 1937, provide this new approach, but for the first time in our history a plan of sustained-yield management for a specific Federal forest property was authorized and outlined in American forest law. The experience of the Department with the forests on Indian lands, from which 92 percent of the gross receipts are returned to the Indians, has shown that planned, sustained-yield management of forests cannot only be successful but that it can be carried out with low administrative costs.

In addition to the national park, Oregon, and Indian forests, the Department of the Interior has jurisdiction over lands in the United States and Alaska where forests are principally administered for watershed protection. While it is obvious that the uses of these different forest lands vary, it is also clear that there are certain fundamental forest principles and techniques, such as fire protection and insect control, as well as the basic policy of the Department, conservation, which apply to all of these areas.

The establishment of the Office of the Director of Forests in this Department will not only make possible the coordination, unification, and promotion of sound basic techniques, principles, and policies for the conservation of all the forest resources under the Department, it also marks a progressive step forward, in accord with the best principles of modern administration, in carrying on the conservation work of the Department.

GRAZING PROGRAM

Progress in the program of range use control is indicated by the fact that, with the completion of preliminary surveys and classification work, temporary 1-year licenses will be replaced during the coming year by term permits of not more than 10 years' duration in 1 grazing district in each of the 10 States affected, namely, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. Installation of the term permit system in all of the 50 Federal grazing districts will be undertaken as rapidly as survey and classification of the 120,000,000-acre Federal range can be completed.

Grazing licenses were issued to 18,752 stockmen owning 9,050,771 head of livestock in 48 grazing districts during the year.

Twelve grazing districts established in 1937 were placed under regulation for the first time in 1938. The amount of Federal range involved in these 12 districts in Idaho, Montana, Oregon, Wyoming, and Nevada, was 30,086,579 acres. The increase in licenses resulting from the addition of these districts was 3,685 and the increase in the number of livestock using grazing districts under regulation was 3,476,148.

The entire public range of about 120,000,000 acres is being surveyed and classified for its proper use and rehabilitation, and more than 20,000 private properties dependent thereon are likewise being appraised.

Forty-five C. C. C. camps operated by the Division carried on a range improvement program which not only relieved present range conditions but also furnished future means for the conservation and protection of the 120,000,000 acres of range land. Under this program more than 1,401,378 acres of the Federal range have been treated for control of ground squirrels, gophers, prairie dogs, kangaroo rats, and jack rabbits, and 98,798 acres were treated for the eradication of poisonous weeds. Protection of wild animals and game birds on the Federal range was assured through the reservation of approximately 8,000,000 acres of land within the boundaries of grazing districts for their use. In addition, more than 3,500,000 acres have been set aside on the public land in three game ranges to be administered jointly by the Division of Grazing and the Biological Survey of the Department of Agriculture. Sixteen wildlife refuges, aggregating in area approximately 4,000,000 acres of public land, have been withdrawn from other uses by Executive order and placed under the Department of Agriculture for the sole purpose of propagating and protecting wildlife.

C. C. C. activities included the transplanting of beaver in small streams in Idaho. An increase in the beaver population has resulted in arresting stream bed erosion and the consequent loss of soil, and in increasing the water supply and stock-watering facilities.

Although 20,752 applications for grazing licenses were filed, satisfaction of stockmen with Division of Grazing operations is indicated by the fact that appeals from decisions were made in only 420 cases.

In Oregon about 500 unclaimed wild horses were removed from grazing districts after being rounded up on the range by airplane and disposed of in accordance with State law and rules of the range. A comprehensive system of fire prevention and control on the public lands in Arizona was established by agreement between the Division of Grazing, the Indian Office of the Department of the Interior, and the Forest Service of the Department of Agriculture. The elimination of 50,000 sheep and 10,000 cattle from the public range in Wyoming was accomplished without any of the affected stock growers requesting a hearing. In this practically new Division of Grazing region, violations of range rules were exceptionally few, only six being reported.

ADVANCES IN EDUCATION

More than 6,000,000 pupils are now enrolled in the 4 years of the public high schools, which, with the addition of private school enrollment, brings the total high-school enrollment to more than six and one-half million. Enrollment in night and part-time schools amounted to approximately one and one-half million persons. Of the 300,000

enrollees in the Civilian Conservation Corps camps, 90 percent participated in the educational program.

Pennsylvania was the third State to provide a parent-education program by legislative action. The other States with such programs are New York and California. Parent-education programs were sponsored through the public school systems in 36 cities.

The President's Advisory Committee on Education submitted its report to the President on February 18, 1938. The committee recommended continuing the present Federal grants and inaugurating a program of new grants to the States for educational purposes with Federal appropriations beginning at \$70,000,000 in 1939-40, and increasing to \$199,000,000 in 1944-45.

SCHOOL BUILDINGS

Despite the fact that from December 1933 to December 1936, the Public Works Administration allotted more than \$244,000,000 in grants and loans for public school buildings, the total estimated cost being more than \$469,000,000, a survey showed that in 62 percent of cities with 10,000 population or more, an additional \$496,000,000 were needed for school construction. The principal reason given for this need was the lag in school building construction during the World War.

RADIO, FORUMS, AND LIBRARY

Through the educational radio project three major programs were produced during the past fiscal year. *Brave New World*, a program based on the good neighbor policy and dealing with Latin America, won first prize as an educational dramatic radio series from the Ninth Annual Institute of Education by Radio. The program, *The World Is Yours*, produced in cooperation with the Smithsonian Institution, ran for 51 weeks. *Education In The News* was also broadcast.

Forum demonstration projects were conducted under the sponsorship of the Office of Education in 18 areas of the country during the fiscal year.

For the first time in its 70 years, library facilities have been adequate for the Office of Education in the new quarters of the consolidated library in the Department of the Interior building. A Library Service Division was organized.

College art was given encouragement by the establishment of a college arts section in the Fine Arts Gallery of the Department.

C. C. C. AND VOCATIONAL EDUCATION

During the past fiscal year 3,517 C. C. C. enrollees received elementary school diplomas, 634 received high-school diplomas, and 13 were awarded college diplomas or degrees. More than 8,800 illiterate enrollees were taught to read and write during the year. The War Department is responsible for the administration of the C. C. C. program, but the professional direction of the educational program is a function of the Office of Education acting in an advisory capacity to the War Department.

The Office of Education continued to carry on activities in the field of vocational education and vocational rehabilitation under the authority of eight separate acts of Congress. Under these acts the

Office of Education cooperates with the States in promoting vocational education in agriculture, the trades and industries, home economics, business education, and in rehabilitating for employment persons disabled through accident, illness, or congenital causes.

TERRITORIES AND ISLAND POSSESSIONS

Canton and Enderbury Islands in the Pacific Ocean were placed under the administrative jurisdiction of the Department of the Interior by Executive order of March 3, 1938. Colonists from Hawaii were landed, the American flag was raised, radio facilities were established, and lighthouses and living quarters were built.

The Matanuska Valley colonization project in Alaska also has been placed under the jurisdiction of the Department, but since the transfer was made by the Works Progress Administration after the close of the last fiscal year a report on its operations is not included herein.

The Territory of Hawaii reported an increase in business and a favorable trade balance. The value of pineapple products increased by \$4,000,000, while the value of sugar exports decreased by approximately the same amount.

The finances of Puerto Rico were in excellent condition last year, receipts being \$43,298,448 while expenditures were \$41,666,329.

The Virgin Islands suffered from a severe drought which did considerable damage to its sugar crop.

REHABILITATION IN PUERTO RICO

The fundamental economic problem in Puerto Rico is due to the fact that while the island is essentially agricultural, having little or no industry, its important crops—sugar, coffee, and tobacco—because of existing legislation or lack of markets, will not support the dense population.

As a consequence, efforts to encourage the production of diversified crops, and utilization of the yield of the land in the manufacture of byproducts, formed an outstanding feature of the Puerto Rico Reconstruction Administration program during the past fiscal year.

Arrangements have been made for the construction of a mill for the manufacture of butyl alcohol and acetone as byproducts of molasses obtained from sugarcane which is the principal crop of the island. Financed by a Puerto Rico Reconstruction Administration loan to the Asociacion Azucarera Cooperativa Lafayette, this plant, having a capacity of 5,000,000 pounds of these solvents annually, is expected to be in operation by January 1, 1939.

Although the Central Lafayette, the island's first cooperative enterprise, had the fourth largest sugar crop in its history, the seriousness of the sugar situation is more readily understood when it is made known that more than 100,000 acres of good cane land, capable of employing more than 25,000 laborers, is now lying idle as a result of the marketing quotas fixed by the Congress. The development of byproducts has been undertaken by the Puerto Rico Reconstruction Administration to find an escape from this dilemma.

A wider use of its agricultural lands, which may make Puerto Rico a strong competitor with foreign countries in the production and marketing of vanilla, is included among our plans for conservation and economic rehabilitation. A pilot plant to cure the vanilla bean

will soon be completed and by 1942 it is expected that Puerto Rico will be in competition in the mainland markets with foreign countries which now produce vanilla oils.

Meantime the Puerto Rico Reconstruction Administration carried forward other phases of its program including rural rehabilitation, electrification, health and recreation projects.

Since the appointment of the Secretary of the Interior as Administrator of the Puerto Rico Reconstruction Administration the average overhead has been reduced from \$140,000 to about \$65,000 a month. The rehabilitation program has also been sharply cut to keep within the reduced appropriation.

PRESIDENT APPOINTS TWO NEW AIDS

The Honorable Ebert K. Burlew, of Pennsylvania, was sworn in as First Assistant Secretary of the Interior on April 8, 1938, and the Honorable Harry Slattery took the oath of office as Under Secretary of the Interior on June 17, 1938. Both Mr. Slattery and Mr. Burlew have been valued members of my staff and I wish to express to you, Mr. President, my appreciation of their appointment to ranking positions in this Department.

Mr. Slattery served in the Department under the administration of the late Franklin K. Lane and he returned to the Department in 1933 at the instance of the present Secretary of the Interior under whom he served as personal assistant. The appointment of Mr. Burlew is especially significant because he is a career man with almost 30 years of service in War, Post Office, and Interior. He was brought to the Department of the Interior from the Post Office Department by Secretary Work. He has been the chief administrative officer of the Department under the present administration and has had general supervision over personnel and budget matters.

In closing, I again renew my recommendation that the name of the Department of the Interior be changed to that of the Department of Conservation.

Legislation is now being prepared with the object of carrying forward our program of conservation. From time to time drafts of these bills will be submitted to you for your consideration.

Very respectfully,

HAROLD L. ICKES,
Secretary of the Interior.

The PRESIDENT,
The White House.





THE KINGS RIVER REGION IN CALIFORNIA, WHICH HAS BEEN PROPOSED
FOR A NATIONAL PARK.

THE NATIONAL PARK SERVICE

Arno B. Cammerer, *Director*

THE conservation program of the National Park Service made steady advances during the 1938 fiscal year. Changes in the administrative set-up resulted in greater efficiency. Cooperation with State and other local governments in park establishment and management emphasized the leadership of the Service in this field. Developments and improvements marked all phases of the Service's conservation program. New theories were tested, policies adjusted to changing conditions, and where necessary new methods adopted.

The full regionalization of all National Park Service activities, put into effect during the year, has functioned with marked success. Land for Region Three headquarters at Santa Fe, N. Mex., was donated to the United States by the Laboratory of Anthropology, and the headquarters unit, of typical southwestern architecture, is now under construction. The site of the headquarters adjoins the laboratory grounds, making the rich resources of that institution readily available to the research staff and other officials of the Service.

A conference of National Park Service executives, park operators, and representatives of cooperating Government agencies was held in Washington, January 17 to 22. During the last 2 days of the conference joint sessions were held with the American Planning and Civic Association, with conservation and recreation the principal topics under consideration.

The President of the United States heads the list of American citizens enjoying their Federal parks. He spoke at the ceremonies incident to the observance of the seventy-fifth anniversary of the Civil War battle at Antietam, and at Roanoke Island, within the area of the proposed Cape Hatteras National Seashore, on the three hundred and fiftieth anniversary of the "Lost Colony" Settlement. The President also visited Yellowstone National Park, Mount Olympus National Monument (now included in the new Olympic National Park), and Fort Jefferson National Monument.

During the year ended September 30, 1937, total travel to the various units of the Federal park system reached an all-time high of 15,133,432. The season ended September 30, 1938, saw 16,233,688 visitors to these areas; a new record.

Early summer touring of the national parks has not kept up this accelerated pace, although still above that for the corresponding period last year. An interesting commentary in this connection is that in several regions use of the Federal park areas held up well despite generally poor economic and travel conditions. Historic areas continued to draw increasing numbers of visitors.

The establishment of the Olympic National Park was achieved in the closing hours of the Seventy-fifth Congress. This major conservation achievement assures the preservation of an adequate representation of the magnificent rain-forests of the Olympic Peninsula and also protects the greater part of habitat necessary to maintain the rare Roosevelt elk.

An item of \$743,265.29, appropriated through the Second Deficiency Act of 1938, makes possible the purchase of the lands still to be included within the authorized boundaries of the Great Smoky Mountains National Park. It is hoped that these lands and those within boundaries approved for the Isle Royale and Olympic National Park projects may be acquired in time to dedicate the areas formally to public use within a year.

Through an appropriation of \$2,005,000 made available in the Third Deficiency Act of 1937, the Service is in process of acquiring 7,730 acres of majestic sugar-pine forest adjacent to Yosemite National Park for addition thereto. This is one of the finest sugar-pine stands in the world, and its acquisition for addition to Yosemite National Park is of particular importance because America's acreage of giant sugar pines is fast dwindling.

The Jackson Shrine—the little frame house in which General Stonewall Jackson died after receiving a fatal wound at the Battle of Chancellorsville—was donated to the United States by the Richmond, Fredericksburg & Potomac Railroad Co., and added to the Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park.

The Salem Maritime National Historic Site, established by designation of the Secretary of the Interior, is the first area of its type to be established under the national policy for historic preservation embodied in the Historic Sites Act of 1935.

Changes in the Federal park system brought the number of areas from 140 to 144 and the total acreage from 17,049,505.80 to 19,187,933 acres.

In addition to its administration of park areas, the Service maintained and operated 110 Federally owned and rented buildings and 7 memorials and other special structures in Washington. Similar service was rendered in 11 Government-owned buildings in 9 cities other than Washington.

The Service continued development of 46 recreational demonstration areas; supervised plans and construction of the Blue Ridge and Natchez Trace Parkways, and extended work on the George Washington Memorial Parkway; supervised estimates and expenditures for the Mount Rushmore Memorial in Custer State Park, the George Rogers Clark Memorial in Indiana, and the Commission of Fine Arts; and cooperated in the Public Works, Civilian Conservation Corps, Works Progress, Emergency Relief, and other emergency programs. As a result of extensive studies, a definite statement of the major objectives involved in planning for the Jefferson National Expansion Memorial at St. Louis was formulated and approved, and extensive research is under way to determine the form the memorial should take. The Service is also the executive agent of the Thomas Jefferson Memorial Commission of Washington.

Plans were completed for the Government to acquire the historic Chesapeake and Ohio Canal, once a famous waterway between Washington and Cumberland, Md. Plans include its restoration for recreational purposes in addition to the restoration of some of the historic lock houses, taverns, and other structures.

As a result of the Historic American Building Survey, information is now available on more than 7,000 early American buildings. During the past year 2,000 measured drawings and 1,800 architectural photographs of historic structures were added to the Survey's growing collection in the Fine Arts Division of the Library of Congress.

The historic sites survey is being prosecuted under 15 broad themes believed to be the most important and far-reaching phases in the social, economic, cultural, and political development of the American people. Groundwork was laid last year for a similar survey in the field of archeological sites.

At the close of the year donations to the National Park Service Trust Fund amounted to a total of \$12,000. Cooperation with State governments in making a study of park, parkway, and recreational-area needs was continued, advice and assistance furnished State and local planning and conservancy agencies, and development of State and other local park areas continued through the medium of the Civilian Conservation Corps.

The United States Travel Bureau continued to function with emergency funds. Offices were maintained in New York and Washington. Legislation to establish the Travel Bureau on a permanent basis unfortunately failed in the Seventy-fifth Congress, but its introduction early in the Seventy-sixth Congress will be requested.

Conservation study programs initiated and conducted in connection with the John Muir Centenary were widely acclaimed by conservationists and educational institutions. A broad radio program also was carried on in Washington and in the field. One weekly radio

series initiated by the Service was piped into the high schools of New York City through the municipal station and also was used by a number of colleges and universities throughout the country, as well as by many commercial stations. The Easter sunrise national broadcast, picked up from areas in each of the country's time zones, was unusually impressive.

The lecture series given in the Interior Department auditorium for the purpose of stimulating an interest in the Federal parks was most successful. Beginning October 13, 1937, 19 lectures were given, attended by a total of 15,304 persons—an increase of more than 38 percent over the 1936-37 attendance record. In addition to capacity audiences at a number of the talks, at times several hundred persons had to be turned away.

Winter sports enjoyed a phenomenal growth in popularity throughout the national parks during the winter of 1937-38.

Special advisory committees on camping, hiking, and skiing were appointed by the Secretary of the Interior to assist the Service in formulating policies and practices concerning these popular recreational activities.

Serious thought has been given to the problem of providing recreation for the heavy Negro population of the Deep South. As a direct result of National Park Service activity in this regard, the public has become aware of this need, and steps have been planned and in some cases action consummated to provide for the leisure time of the southern Negro population.

The forest protection record through the Federal parks was unusually gratifying. The number of forest fires reported in the western national parks was the lowest since 1930. Through an intensive educational campaign, the cooperation of visitors was obtained in forest protection.

The Safety Division, established last year to reduce fire losses and accidents to visitors and employees, has proved a decided asset to the Service.

Radio communication service in the national parks and monuments proved invaluable in fire protection and other work. Outstanding service was rendered in several flood and storm emergencies. Mount McKinley National Park in Alaska was provided with radio communication facilities for the first time.

The Director of the National Park Service continued to act as a member of a wide range of commissions, in connection with his Federal park administration. He is vice chairman and executive officer of the National Capital Park and Planning Commission; member of the District of Columbia Zoning Commission, the Washington-Lincoln Memorial-Gettysburg Boulevard Commission, the National Park Trust Fund Board, the Alley Dwelling Authority of

Washington, and ex officio of the Fredericksburg and Spotsylvania County Battlefields Memorial National Park Commission, and the Petersburg National Military Park Commission; and the representative of the United States on the International Commission on Historic Monuments.

The National Park Service reports with regret the death of Archibald M. McCrea, member of the Advisory Board on National Parks, Historic Sites, Buildings, and Monuments, and of Dr. George Bird Grinnell, world-famous naturalist, who made outstanding contributions to the cause of preservation of national parks.

REGIONALIZATION PROVES HIGHLY EFFECTIVE

The regionalization of all National Park Service activities approved during the 1937 fiscal year went into effect August 1, 1937, and functioned efficiently and effectively. Establishment of closer relationships with executives charged with various administrative units of the Federal park system and acceptance of a greater degree of responsibility for regular and emergency programs in those areas were the most marked results of the transition from the previously existing emergency regionalization to the present national park regional organization.

Roughly, Region One, with headquarters at Richmond, Va., covers the eastern seaboard and the Deep South. Region Two, with headquarters at Omaha, Nebr., covers what are known as the Middle Western States and extends west to Yellowstone National Park. Region Three, headquarters, Santa Fe, N. Mex., covers the Southwest. Region Four, headquarters in San Francisco, covers the Pacific coast, extending eastward to include Glacier National Park.

A review of the first year of regionalization and an appraisal of its value to the areas of the Federal park system and to the Washington office indicate that the functioning of the four regions has wrought a definite improvement in the methods of handling certain phases of park work, particularly in the field of public contacts.

Personal contacts by regional officers with local public officials, influential groups, and representatives of other Government agencies engaged in allied work have been possible and continuous, resulting in a better understanding of the objectives of the Service in the scheme of Federal conservation. Regional contacts with the public generally have led to a quickened interest in National Park Service affairs on the part of the public and to a growing appreciation of the ideals and objectives of the Service in matters dealing with the conservation of our scenic, scientific, and recreational resources.

In addition to achieving better coordination of field activities as a whole, regionalization greatly facilitates the investigation of the many areas proposed for inclusion in the Federal park system.

COMMERCIAL DESPOLIATION OF YELLOWSTONE LAKE AGAIN THREATENED

Yellowstone National Park, first of the national parks to be established, model of parks in this country and abroad, again is threatened with despoliation of its scenic beauty. (See Annual Report of 1920.) Bills (S. 3925 and H. R. 10469) introduced in the last session of Congress had for their purpose the diversion of the water of Yellowstone Lake for commercial irrigation purposes. Construction of a dam and tunnel within the park area is a part of the scheme.

This proposal, the latest in a series of attempted raids on the Yellowstone involving the use of its waters for irrigation purposes since 1919, met instant resistance in the Department of the Interior and aroused widespread alarm and indignation among conservationists.

In a period when the need for conservation of natural resources is widely recognized and methods to achieve it are receiving serious study and consideration, the idea of diverting the waters of the Yellowstone for commercial purposes is a backward movement, and one that, followed to its logical conclusion, would result in emasculation of the entire national park system.

Use of the waters of the Yellowstone for commercial purposes would be contrary to the basic laws and purposes of national park creation. It would result in the eventual despoliation of that lake and other lakes, and eventually of a large part of the park itself. It also might disrupt geyser and hot spring activity. The precedent thus established would undoubtedly lead to enormous pressure for similar commercial concessions in other important areas of the Federal park system.

Such abuse of the parks not only would ruin their scenic beauty, but in the long-run would prove a boomerang to the communities which would receive immediate benefit were the the park waters tapped. A recent survey of business conditions in the State of Wyoming, which, with the Department of the Interior, also is strongly opposed to the diversion, indicates that visitors to the Yellowstone and Grand Teton National Parks during the 1937 travel year spent \$14,221,713 of "out State" money in Wyoming. A Yellowstone used for commercial purposes would mean loss of much of that revenue.

From a strictly ethical standpoint, to permit the diversion of the waters of Yellowstone National Park for commercial purposes would break faith with the men who by their vision and generosity made possible its establishment.

It will be remembered that at the close of the 1870 exploration of the Yellowstone country, the various members of the party had plans for preempting certain sections of it for their own use, in accordance with current land practices. At the suggestion of one of their number, these men gave up all idea of personal profit that the

wonderland might be preserved for posterity as a public park. They had the moral and legal right to claim the land and pass it on to their heirs or sell it to others who would so devise it. Since they did not do so, it should remain inviolate for the purposes for which they gave it to the people.

SHORTAGE OF PRINTED INFORMATIONAL LITERATURE

The National Park Service is placed in the anomalous position of supervising the most spectacular scenery and the outstanding historic shrines of the country, of being besieged for information by many millions of people, and of being totally unable to meet the demand for such information through lack of adequate supplies of printed literature.

Last year more than 15,000,000 persons visited the various units of the Federal park system. Millions more—prospective visitors, students of secondary and high schools and colleges, study groups, and travel organizations—wrote to the National Park Service headquarters in Washington, the regional offices, the parks themselves, and the Travel Bureau in New York City, requesting printed literature.

Unfortunately, the bulk of these requests had to be denied. With approximately the same printing fund available as in 1932, but with nearly three times the number of areas to administer and with more than four times the number of annual visitors, increased printed costs made it possible to issue only 576,000 information circulars in 1938, as against 869,000 in 1932—and this despite the reduction in size of circulars. The raising of the ban on multilithing of informal leaflets through the Department's facilities gave a small degree of relief, but in no way solved the problem.

In line with the policies of foreign governments, which recognize in their travel trade a tremendous source of revenue, the National Park Service should be in a position to issue sufficient free printed informational circulars on the Federal park areas of the United States, and of booklets grouping these areas by travel regions, to meet the demands of all prospective and actual visitors.

Not only should larger quantities of information circulars be printed for the older areas, for which scant supplies now are issued, but provision should be made to print informational booklets concerning the many areas transferred to the jurisdiction of the National Park Service in 1933, and new areas created in recent years by Presidential proclamation or act of Congress.

In this connection, it must be emphasized that adequate supplies of printed information on the national parks and monuments are a prime requisite of the Travel Bureau of this Service, if that new unit is to function efficiently.

The increasing observance of Conservation Week throughout the country, especially in schools and by study-groups, has resulted in an increased need for printed park material; and supplying such literature should be a part of the Federal participation in every international exposition. In 1931, at the Overseas Colonial Exposition held at Paris, France, 100,000 copies of a national park booklet, prepared by the Service, were made available through the financial cooperation of the various transportation lines serving the parks. Efforts to secure Federal or private funds for similar purposes since that time have failed.

Printed literature is not the only printing need of the Service. Posters should be available, comparable to those issued by foreign governments to encourage tourist travel, for display and distribution not only in the regional offices, Travel Bureau offices, and other units of the National Park Service, but also through museums, educational institutions, travel organizations and industrial concerns, and at international expositions, in this country and abroad. The issuance of a few posters under an emergency fund several years ago met with widespread approval and use. Unfortunately, however, a demand was created which the Service no longer is able to meet, as emergency funds are not now available for this purpose.

Until provision is made for the printing of sufficient circulars and posters to meet the popular demand, a large amount of time must continue to be spent both in Washington and in the field answering the protests of disappointed applicants for circulars, of members of Congress whose constituents are unable to secure booklets, and of cooperating travel-encouraging organizations such as local chambers of commerce and automobile clubs.

RESEARCH AND EDUCATION

The wilderness areas of the national parks and monuments are among America's finest laboratories for the study of conservation.

Within the park system all forms of life are protected. The parks, therefore, are more than mere refuges for certain selected species. They are complete sanctuaries designed to perpetuate a complete fauna and flora and to furnish evidence of the orderly way in which nature maintains her domain. Species of animals and birds not found in abundance elsewhere are tame and viewable in the parks. Examples of earth-building forces are vividly present. More and more university scientists are finding these national areas, with their unspoiled, superlative lakes, forests, and mountains, to be the best possible places to which to take their classes for study. In them questions and answers and demonstration come together.

One of the most interesting educational features of the Service's year was its part in the Nation-wide celebration of the one-hundredth

anniversary of the birth of John Muir, great conservationist and "father" of many national parks. Special programs including lectures and pageants were given in the parks, and in the Washington office a John Muir study program was prepared, providing important and new material which stimulated commemorative ceremonies and additional study in many schools and women's clubs.

NEW KNOWLEDGE

Research studies carried on in the field by members of the National Park Service and by cooperating public and private institutions provided much new knowledge to be passed on to the visiting public. Natural history discoveries and investigations made during the year include:

Accumulation of data on many new species of birds, animals, and plants.

Collection of information on the interrelations of various organisms.

Cataloging of biological material, showing what each park affords.

Compilation of a mimeographed Check List of Birds of the National Parks, summarizing such information as now exists on the avifauna of 23 park areas in answer to a growing demand for information made by both administrators and visitors.

Collaboration with representatives of the Bureau of Biological Survey, Forest Service, Office of Indian Affairs and Coast Guard in the section on Wildlife Resources of the report *Alaska, Its Resources and Developments*, prepared under the direction of the National Resources Committee.

Continuation of range studies in Yellowstone, Zion, Hawaii, Wind Cave, and Rocky Mountain National Parks and at Lava Beds and Chaco Canyon National Monuments to determine the carrying capacities for big game and other species.

Continuation of investigations of bighorn at Rocky Mountain and Glacier National Parks, and conducting of field studies on mammals at Crater Lake National Park, Lava Beds, and Black Canyon of the Gunnison National Monuments, and in the proposed Big Bend National Park.

Collection of plant specimens and floral studies at Rocky Mountain, Mount Rainier, Great Smoky Mountains, Platt, Hawaii, Yosemite and Crater Lake National Parks, and Death Valley National Monument. Collection of botanical and ethnobotanical specimens at Hawaii National Park and at six southwestern monuments. Improvement in most parks in the status of scientific collections.

Initiation of a field study of evidence pointing to the origin of Crater Lake, financed by the Carnegie Institution of Washington and supervised by Dr. J. Howel Williams of the University of California.

Near completion of projects begun in Yosemite and Sequoia National Parks by Francois E. Matthes of the United States Geological Survey, including preparation of a series of illustrated albums with appropriate text to tell the geologic story of Sequoia and text for the key labels and statements designed to explain the geology of the Yosemite area to visitors.

Preparation of a text on the story of granite to be placed on top of Sentinel Dome in Yosemite National Park.

Inauguration of a study on the factors which control beach erosion and deposition of sand at Cape Hatteras National Seashore Project.

Completion of a year's field study of the coyote and its relationship to other wildlife species in Yellowstone and Grand Teton National Parks. As yet predation on game mammals and birds has not been severe and no emergency has been found to exist. There is evidence, from analysis of coyote food habits, of a favorable relationship of the coyote with other species. Study of economic food habits of the coyote in Lava Beds National Monument, in order to determine the effect of this species on the game-bird population of the adjacent Tule Lake Migratory Waterfowl Refuge, revealed that destruction of ducks and eggs by coyotes during the nesting season was of slight importance and did not warrant coyote control on the monument.

Continuation of studies of nesting Trumpeter Swans by park personnel at Yellowstone National Park. The 1937 census of this rare species revealed a total of 69 swans within the park. The number of cygnets was 50 percent greater than the number successfully reared in 1936.

Fish research study in several parks. Studies on ecological and historical factors involved in trout distribution in the Great Smoky Mountains National Park culminated in a paper by a wildlife technician published in the Journal of the Tennessee Academy of Science, in October 1937. A temporary ranger naturalist carried on studies of aquatic flora and fauna in Crater Lake, in connection with a survey of fish food and growth rates in trout.

Refinement of the geological map and preparation of a guide book of Mount Desert Island (Acadia National Park) based on field studies.

Discovery of fossils important to the interpretation of the geologic history of Great Smoky Mountains National Park in a limestone hitherto thought to be barren.

Discovery of new fossil plants in Petrified Forest National Monument.

Two discoveries of interesting prehistoric animals in Death Valley National Monument, one by the park naturalist and one by a representative of the Geological Survey. In addition to these discoveries, much progress was made in unraveling the geologic history of the monument.

A study of the origin of the gypsum at White Sands National Monument and preparation of an interpretative exhibit for the monument museum.

Continuation of research at Boulder Dam and installation of material previously collected in the museum space assigned in the new administration building.

Completion of an areal geologic map covering the proposed Big Bend National Park.

Establishment of a research plot at Shelby Forest, Tenn., for study of the cycle of erosion in loess deposits.

Cooperation of park naturalists in five national parks with the National Geophysical Committee in measuring the advance or retreat of the ice front of critical glaciers.

Earthquake studies by the park naturalist at Lassen Volcanic National Park in cooperation with the University of California. Continuation of volcanological studies in Hawaii National Park.

Revision of the technical circular, The Construction of Relief Models, so that it may be issued as a project training circular for the C. C. C.

Several natural history associations have aided the Service by publishing pamphlets and books containing information gained through research in the national parks. Mammals of Zion-Bryce and Cedar Breaks was issued by the Zion-Bryce Natural History Association in January; Birds of Rocky Mountain National Park by the park naturalist of that park was published by the Rocky Mountain Nature Association in March; and Check List of Birds of Grand Canyon National Park, by an assistant wildlife technician was issued in July 1937 by the Grand Canyon Natural History Association. In addition to these, the Government Printing Office published Fauna Series No. 3, Birds and Mammals of Mount McKinley National Park, by Joseph S. Dixon, Field Naturalist of the Service. About 20 other papers, covering distribution, food habits, and behavior of mammals and birds and management of mammals and fish in National and State parks, were published.

NATURALIST PROGRAM

The Service continued to expand its lecture, conducted trips and museum programs. Public interest is attested by the very large attendance records of the year, individual guided trips in some of the larger parks averaging from 50 to 125 persons per trip and some of the auto caravans including from 25 to 85 cars, making organization and instruction difficult for the limited staffs. Microphones were necessary at some campfire programs to enable large audiences to hear the speakers. Only increased man-power will make it possible to handle the public in smaller groups as should be done.

With a total staff of 125 naturalists, 33 of whom are on the permanent staff and 92 on the temporary ranger-naturalist staff, the Service contacted 4,500,000 visitors through lectures and guided trips during the year. Sixty percent of all visitors to parks maintaining such programs took part in the activities.

Recent surveys indicate that the public is most interested in trips and lectures designed to orient them with reference to the area they are visiting. Demands for trips of longer duration indicate a growing desire for more specific knowledge and a greater appreciation of park features. Wherever possible these longer trips have been added to the park programs, and several new amphitheaters have been constructed to facilitate campfire programs.

Two interesting new features are the rerouting of the famous Crater Lake boat trip to allow a naturalist to explain the scientific features in the walls of the crater as the boat passes, and the establishment of a Junior Nature School for Children in Rocky Mountain National Park. The school is designed for youngsters unable to take the more strenuous nature hikes. Numerous natural history subjects and the conservation of natural resources are taught.

A new type of self-guided trail known as the desert trail has been arranged at Casa Grande National Monument, so that interested visitors may see archeological and biological features not encountered on the regular guided trips.

During the past year successful experiments have been made in the use of natural color photography in the visual education programs sponsored by the Service.

TRAINING OF NATURALISTS

Improvement has been made in service through the selection of better trained and more mature men to serve as ranger-naturalists during the summer season.

The Yosemite School of Field Natural History, a graduate school with a college degree as entrance prerequisite, operated again the past season, training prospective national park personnel qualified for naturalist positions, both permanent and seasonal. The Secretary of the Interior has designated this school and the Yosemite Junior Nature School as nonprofit, scientific organizations engaged in a training enterprise helpful to the Service. The 1938 session, the fourteenth class of the school, began courses on June 20 with the selection of 20 students (14 men and 6 women) from more than 100 applicants.

Yale University continued its cooperation, assisting in National Park Service personnel training through awarding two graduate fellowships to Service employees. The fellowships are open to those interested in graduate studies bearing upon the educational or inter-

pretative program of the Service and may include wildlife, forestry, geology, biology, history, archeology, psychology, and education.

MUSEUMS

Continuing a policy of portraying certain phases of the American scene in a correlated story rather than by case after case of irrelevant objects, the Service's museum development program made great progress in 1937-38. Laboratories at Berkeley, Calif., Washington, D. C., and Fort Hunt, Va., assisted by P. W. A., E. R. A., and C. C. C. funds, are responsible for museum improvements in 37 national parks and monuments and in 5 State parks. In some instances, new exhibits have been prepared, in others old ones revised, and in many, new equipment and exhibit cases have been installed.

Fireproof housing for the priceless exhibits already accumulated in field museums is a primary objective in museum development.

Perhaps the foremost accomplishment in the museum field was the completion of the Department of the Interior Museum, which was opened to the public on March 9 and which portrays the history, organization, and functions of the various bureaus of the Department.

Noteworthy among the areas in the West which have been improved are Scotts Bluff National Monument, where the geology wing of the museum was completed for installation of a most interesting collection of extinct animal fossils found in the cliff on which the monument stands; Yosemite National Park, where exhibits for the Indian and geology rooms of the museum were revised and many physical improvements made including better housing for research collections; Crater Lake National Park, where the Sinnott Memorial was made waterproof and exhibits revised; and Tumacacori National Monument, where a new museum was opened to the public with exhibits telling the story of the coming of the Spanish to this region and the incidents connected with the mission. Lack of funds prohibited the completion of the museum at Morristown National Historical Park, although the history room has been opened to the public.

Dioramas, photographs, paintings, and models were sent out for display at 15 expositions, a large quantity of material having been sent to Stockholm, Sweden, for the Swedish-American exhibit at A. B. Nordiska Kompaniet.

High recognition of the value of the museum work the National Park Service is doing was received in the award of Rockefeller fellowships to two of the personnel for study with the Buffalo Museum of Science.

WILDLIFE MANAGEMENT

Studies have been made in an effort to solve the troublesome problems of deer and bear management in certain parks, and fish-cultural activities have been improved through cooperative projects.

Management of deer has received attention in parks where the feeding of animals by tourists has tended to pauperize them and in those parks where abnormal and unnatural concentrations of animals have resulted in serious reduction of natural food supply. The problem has been attacked at Yosemite and Sequoia through discouragement of feeding and by moving deer to other portions of the respective parks. Plans have been drafted for use of the same methods at Zion with possible additional control by hunting outside the park.

Improvements have been made in bear management in the larger parks where serious problems have resulted from too close contact between bears and the public. Bear shows in Yellowstone, Yosemite, and Sequoia National Parks have been modified toward a less artificial presentation. An educational campaign has been initiated to inform the public that bears should be let alone to prevent possibility of human injury. As nearly all injuries inflicted by bears are directly or indirectly due to human interference, a new Service regulation, approved by the Secretary, prohibits all feeding of bears by the public and should aid in reducing injury hazard to a minimum.

In the past year, fish-cultural activities in the national parks have shown notable improvement. Through the cooperation of the Service with the Bureau of Fisheries and State game departments, 22,330,000 fish, principally trout, were planted in the waters of various national parks and monuments. This is an all-time record for fish planted in Federal park areas. Almost 41,000,000 black-spotted and rainbow trout and grayling eggs were obtained last year from Yellowstone Park waters—another record.

There is evidence of improved fishing conditions in many park waters. As the continued increase in park travel has resulted in the heavy utilization of fish resources, there is an increasing need for an enlarged planting program. This need will be met in Glacier National Park through the operation of the Jessup Mill Fish Hatchery, soon to be constructed, and in Yosemite by a new spawn-taking development at Lake Eleanor.

An agreement among the National Park Service, the Bureau of Fisheries, Bureau of Biological Survey, Game Commissions of Nevada and Arizona, and interested sportsmen's organizations has been reached, placing the control of fish planting in Lake Mead and other waters of the Boulder Dam National Recreational Area in the hands of the National Park Service, with cooperation from the other agencies.

Elk reduction was carried on in Yellowstone National Park and vicinity in the winter of 1937-38, as in the past 3 years, in an effort to limit the herd to the carrying capacity of the winter range. After the herd reduction, a census showed 10,976 animals still on the northern Yellowstone range.

PRESERVATION OF HISTORIC SITES AND BUILDINGS

Just as the scenic areas provide unparalleled laboratories for the study of natural sciences, so the historic and archeologic areas of the National Park Service are ideal classrooms for students of American history and prehistory.

Research and investigation designed to add new knowledge to its records and actual working information for restorations and repairs are among the principal duties of the staff. Important projects of the year included:

Completion of a comprehensive study of the history of Fort Pulaski.

Near completion of a detailed study of the military operations culminating in the Battle of the Wilderness.

Completion of research study of the Oglethorpe Trail from Savannah to Augusta, Ga.

Compilation of a record of photographs taken by M. B. Brady during the War Between the States, a record expected to be extremely valuable in the development and interpretation of military areas of that period.

Copying of important manuscripts, including records of La Purisima Mission, which is being restored by the State of California with the assistance of the Service, and an extensive collection of Revolutionary manuscripts at Morristown National Historical Park. The microcopying and projection equipment purchased last year was used for this.

Formulation of a statement of the major objectives to be incorporated in the planning and building of the Jefferson National Expansion Memorial in St. Louis, Mo. The staff was assisted by the Advisory Board on National Parks, Historic Sites, Buildings, and Monuments and the statement has been approved by the Secretary of the Interior. Extensive research is now being undertaken to determine the form of memorial best suited to portray events in and the far-reaching results of our national expansion. On January 10 the Secretary approved the expenditure of \$100,000 from funds allotted to the Jefferson National Expansion Memorial for the preparation of illustrative material concerning the project.

Preparation for inaugurating historical studies of the Chesapeake and Ohio Canal, interesting old waterway from Georgetown, D. C., to Cumberland, Md., as plans for its development are formulated. The canal had close historical association with early movements sponsored by George Washington to open communications between the frontier and tidewater sections, and with the destinies of cities along the Potomac.

Completion of the extensive and long-awaited Schneider report. In the fall of 1934, Mr. J. Thomas Schneider began, at the request of the Secretary of the Interior, a comprehensive study from funds furnished

by the Rockefeller foundation, international in scope, entitled "Report on the Preservation of Historic Sites and Buildings." During the past year the Advisory Board approved its publication and copies will soon be available for distribution to Federal and State agencies interested in historical and archeological conservation. Part I reviews Federal, State, local and private progress in this field in the United States; part II discusses the legislative history and administrative organization for the preservation of historic sites and buildings in Great Britain, France, Germany, Italy, Sweden, and other foreign countries; part III is a detailed analysis of the Historic Sites legislation enacted August 21, 1935, setting forth conclusions and recommendations for effectuating the broad national policy of historical and archeological conservation embodied in the legislation.

Accumulation of valuable data relating to the history of Fort Laramie, Wyo., to the Derby Wharf area of Salem, Mass., and to Ackia Battleground, Miss., in preparation for future development programs of these three areas.

Collection of information needed for base sheets in master plans showing physical aspects and historic points at the time of the greatest historic significance of an area.

Other major studies in progress, some completed, during the year, were concerned with the Battle of Manassas, Va.; the Vicksburg Campaign, Miss.; the George Washington Birthplace National Monument, Va.; Goliad Mission, Tex.; the route of the Death Valley pioneers, 1849-1850; Mackinac Island State Park, Mich.; Civil War guns and gun carriages; and eighteenth century Spanish ordnance.

During the past year, the desirability of increasing close cooperative relations with learned institutions in the fields of history, archeology, and architecture has become more than ever apparent as essential in research and scientific survey designed properly to evaluate historic sites. Accordingly, the National Park Service enlisted and secured the cooperation of the following scientific institutions preeminent in the fields of study with which the Service's historical program is most directly concerned:

The National Archives and the Library of Congress in the field of history;

The Smithsonian Institution in the field of archeology;

The American Association of Museums in the museum field.

With the guidance of these institutions and the Advisory Board, considerable progress has been made in a Nation-wide survey of historic sites. A total of 620 sites have been inventoried; 200 proposed areas have been investigated; and 600 sites have been classified as eligible for further study under the 15 broad themes believed to be the most important and far-reaching phases in the social, economic, cultural, and political development of the American people. During

the past 6 months special studies have been made of sites classified under Theme One, Spanish Exploration and Settlement, with particular reference to the sixteenth century.

In actual preservation activities, the Service has greatly extended the program for the development of Ocmulgee National Monument with a view toward eventual centralization of southeastern archeological studies at Macon, Ga. It is contemplating the construction of a museum there to serve as a center of research activity.

Through its general program of State cooperation, the Service has contributed to the preservation of many sites on areas of primary historical or archeological interest throughout the country. Among the more important are:

Fort Clinch State Park, Fla.; Fort Morgan State Park, Ala.; Columbus-Belmont State Park, Ky.; Longfellow-Evangeline State Park, La.; Fort Frederick State Park, Md.; Illinois-Michigan Canal, New Salem, Lincoln Log Cabin and Pere Marquette State Parks in Illinois; Spring Mill State Park, Ind.; Mackinac Island State Park, Mich.; Fort Ridgely State Park, Minn.; Fort Lincoln State Park, N. Dak.; Fort Sisseton and Custer State Parks, S. Dak.; Fort Parker and Big Bend State Parks, Tex.; Fort Lowell State Park, Ariz.; Fort Churchill State Park, Nev.; and La Purisima State Park, Calif.

The Service also continued to review projects covering restoration of sites and structures under the W. P. A. and extended this cooperation to other departments which supervise C. C. C. projects of the same character.

ADVISORY AND TRUST FUND BOARDS

The Advisory Board on National Parks, Historic Sites, Buildings, and Monuments suffered a grievous loss by the death of Mr. Archibald M. McCrea.

The National Park Service Trust Fund Board accepted donations of \$3,000 from Metro-Goldwyn-Mayer and \$1,000 from Twentieth Century Fox moving picture corporations which took motion pictures in Zion and Mount Rainier National Parks. These contributions brought the donations credited to the national park trust fund account to a total of \$12,000. No expenditures were made from the fund during the year.

FOREST PROTECTION AND FIRE PREVENTION

Not only are trees an essential element in nearly every park of major scenic importance, but in themselves the magnificent virgin forest stands are an irreplaceable asset—sometimes the principal reason for park creation.

Protection of the park forests, therefore, is a vital part of park administration, and one to which increasing attention is being devoted.

Fire, the most serious enemy of the forest, is a two-headed foe. Sometimes it strikes through lightning, but more often it is man-caused. During the past year the Service was fortunate in having no serious forest fires. The 1937 fire record, as shown on pages 42-45, is indeed gratifying, especially when taken in conjunction with the fact that of the approximately 19 million acres of land in the Federal park system, more than 8 million acres require fire protection.

For the western parks the number of man-caused fires was the lowest since 1930. Gratifying as this record is, the field personnel is faced with a difficult task in combating the carelessness of visitors when handling fire in the out-of-doors, for 67 percent of all the park fires in 1937 were man-caused. A concerted effort was made to cut down the number of man-caused fires by reduction of fire hazards and through public contact and educational efforts.

It was possible to give more intensive training in fire protection to park rangers, fire guards, and C. C. C. supervisory personnel and enrollees than in the past. Participation by park protection personnel in fire prevention training given by cooperating protection agencies was also authorized by Congress.

The program for taking panoramic photographs from fire lookouts and observation stations, as a means of improving fire detection and fire dispatching within the national park system, was completed. This program, initiated 4 years ago, envisioned the preparation of panoramic photographs from all existing, proposed, and emergency lookout points in all the national parks and monuments. Copies of these panoramic photographs have now been placed in the hands of the proper fire protection personnel throughout the entire Service and cooperating agencies. Additional work will of necessity be done in the future in new areas or where a review of present detection facilities indicates a need for restudy through the means of such photographs.

During the past year five 1½-ton fire trucks equipped with water tanks and pumpers were distributed to Acadia, Great Smoky Mountains, Mammoth Cave, Crater Lake, and Hot Springs National Parks as welcome additions to the fire suppression equipment. Within the limited available appropriations every effort is being made to place adequate mobile fire apparatus in those areas where fire studies indicate a need.

Insect control.—Extensive surveys of forest insect conditions in the western national parks and monuments indicated an improvement over the preceding year as a result of the control program under way for a number of years. The epidemic of the Black Hills and Douglas fir beetle in Bryce Canyon National Park made it necessary to con-

tinue control work, but on a greatly reduced scale, this year. A serious epidemic of the Black Hills beetle in and adjacent to Rocky Mountain National Park was controlled by joint action with other Federal agencies. In cooperation with the Forest Service and W. P. A. control operations for the Black Hills beetle on 70,000 acres of forest in and around the Denver Mountain Parks were initiated during the year. Serious mountain pine beetle and Engelmann spruce beetle infestations exist in Yellowstone National Park, and the lodgepole needle miner still continues to menace the lodgepole pine stands in Yosemite National Park.

In the eastern national parks and monuments insect conditions were for the most part endemic during the year. Shenandoah reported an unusual outbreak of the walking stick, on which very close observations will be maintained. Control operations against the Japanese beetle at George Washington Birthplace National Monument were initiated last summer by spraying 12 acres of ground with lead arsenate. The beech scale insect infestation was found to be epidemic in Acadia National Park and all beech trees were sprayed with lime sulphur.

Blister rust control.—The white pine blister rust disease, which has been moving from the Pacific Northwest southward into California, became so menacing during the year to the five-needle pines in Lassen Volcanic, Yosemite, General Grant, and Sequoia National Parks that plans were made to initiate control operations this summer. Eradication of *Ribes* (currants and gooseberries), the alternate host of the white pine blister rust, was started in Yosemite National Park in June, and similar work will be initiated soon in the other three parks. This threat to the white pines of California, including the sugar pine, the western white pine, and at the high elevations the white-bark and the foxtail pines, must be controlled if these species are to be conserved for posterity in the national parks of California. Prompt and efficient control of the disease is without doubt one of the most important conservation measures demanding the attention of this Service at this time.

Blister rust control projects were continued in Mount Rainier, Crater Lake, Acadia, and Shenandoah National Parks. Blister rust reconnaissance surveys were started in Yellowstone National Park, since the disease is known to be within a few miles northwest of the park.

Tree preservation and repair.—The C. C. C. itinerant tree preservation crew, which for 2½ years has provided the care necessary for the preservation and repair of important trees in the national cemeteries, national battlefield sites, national historical parks, and national military parks, was discontinued because of diminishing C. C. C. appropriations.

Type mapping.—The type mapping program for the purpose of obtaining a detailed inventory and map of the vegetative cover of the parks for use in planning protection, development, and use of the areas was materially curtailed during the year. This work is now very largely completed. The few exceptions are Acadia National Park and the more recent extensions to existing areas. Approximately 6,913,000 acres have been mapped to date, and copies of the maps and of the inventories are being placed in the hands of the park superintendents for their use in protection and administration. Much additional information has been provided by this work relating to the flora of the parks, and a project is under way to assemble in printed form a check list of the flora of the western national parks and monuments.

Forest nurseries and planting.—Forest nurseries are operated in Sequoia, Yellowstone, Great Smoky Mountains, Shenandoah, and Platt National Parks for the purpose of raising planting stock for reforestation of burns where natural reproduction is lacking, for landscape planting, for planting for erosion control, and for replacements of dying trees in and adjacent to public campgrounds and other developed areas.

Over 3 million seedlings obtained from the Soil Conservation Service were planted in recreational demonstration areas for the purpose of assisting in erosion control or to reforest cut-over or burned-over lands.

Emergency appropriations make forest protection possible.—As in the 3 preceding fiscal years, all forest protection improvements, insect and tree disease control, type mapping, and tree preservation activities were financed from the emergency appropriation. The meager allotment for forest protection and fire prevention for the fiscal year 1938 under the regular appropriation provided funds only for the most essential needs for fire protection personnel and equipment which could not be supplied under the C. C. C. program. The above forest protection accomplishments therefore are largely represented in the report of the C. C. C. program.

PLANNING AND CONSTRUCTION

The ever increasing number of visitors to national park areas is making necessary the application of all the ability of the landscape architect, the architect, and the engineer to retain the primitive qualities of those areas while permitting intensive human use.

Apart from major road construction, approximately 600 job plans involving new areas, new buildings, and practically all types of park construction were studied.

A new edition of the comprehensive master plan for each national park area has been prepared to enable the National Park Service to

program efficiently the necessary future development with as little violation of natural beauty and qualities as possible. In addition, some 6,000 job plans for similar work in State park, recreational demonstration project, and work camp areas were reviewed, and technical engineering and landscape advice and assistance rendered to the State park authorities, especially on jobs involving major and difficult design. Appropriations were considerably less than in recent years with consequent postponement of development of some individual areas.

A long-awaited building project in Alaska, the hotel at McKinley Park Station and auxiliary buildings was started and practically completed through a P. W. A. allocation of \$350,000. Although the hotel will be operated by the Alaska Railroad, planning and supervision of construction were handled by the National Park Service. An attractive structure was erected at Tumacacori National Monument to serve museum and administrative purposes adjoining the ruins of the interesting Spanish mission. Other P. W. A. funds provided for the restoration of historic buildings and wharf at the Salem Maritime National Historic Site and for the preparation of plans for a fish hatchery group to serve Glacier National Park. Public Works funds were combined with C. C. C. labor for the reconstruction of a lodge at Petrified Forest National Monument, which is rapidly nearing completion. The C. C. C. made an important building contribution with the completion of the cave elevator building at Wind Cave National Park. A large and attractive development for the regional office at Sante Fe, N. Mex., is being built by the C. C. C. and E. R. A.

The Statue of Liberty National Monument will be beautified and its facilities greatly improved through the allotment of E. R. A. funds for planning and redevelopment. Visitors to the New York Worlds Fair in 1939 will find that famous area more attractive and better able to care for them than ever before.

Through its engineering staff the Service coordinated with other bureaus matters pertaining to technical collaboration in connection with water utilization or control projects, both authorized and projected, where those projects may have some effect on an existing or proposed national park area.

Through the loan of its personnel and facilities, the Service cooperated with other agencies as consultant, particularly in connection with dam design and the soil mechanics work of the engineering laboratory.

One of the more important accomplishments of the year was the completion of a comprehensive road-maintenance study and report covering all Service areas with a tabulation of all roads as to class, type of construction, and maintenance estimates, including maintenance equipment inventory and needed equipment to carry on the

recommended maintenance program. This is the first complete composite record of all roads in the park system, and a step toward more adequate maintenance and centralized control. As in the past, the Bureau of Public Roads of the Department of Agriculture continued major road building for the Service.

Under the roads and trails appropriation of \$4,500,000 for the 1938 fiscal year a number of the larger road systems were improved, and the first major road in the new Boulder Dam area was started. Construction was begun on the Fresno-General Grant approach road and on the Zion-Bryce Canyon approach road.

PARKWAY DEVELOPMENT

The Blue Ridge and Natchez Trace Parkway projects, pioneers in their respective fields of national recreational and historical motor travel, continued to develop under regular Federal appropriations.

The Blue Ridge project, with 115 miles graded and 50 miles additional under grading contract, is rapidly approaching a useful stage as far as the Roanoke-Asheville unit is concerned. Development of recreational parks adjacent to the parkway continued, as well as construction of bridges and overpasses.

On the Natchez Trace project, grading continued on three sections, totaling 34 miles in Mississippi. Survey and location work was carried on in Mississippi, Alabama, and Tennessee, in collaboration with the Bureau of Public Roads.

The city of Washington saw another step forward in the extension of the George Washington Memorial Parkway when work on the Columbia Island development was placed under contract.

HISTORIC AMERICAN BUILDINGS SURVEY

Continuing its program of making a permanent graphic record of all important existing monuments of the builders' art erected in the United States and possessions before the last quarter of the nineteenth century, the survey of historic American buildings entered its fifth year of continuous field work. Under the supervision of the National Park Service a number of State W. P. A. projects and several university collaborative programs were organized or continued, adding more than 2,000 measured drawings and 1,800 architectural photographs to the growing collection in the Fine Arts Division of the Library of Congress. The master index of early American buildings being made by the Survey was considerably advanced during the year and now contains information on more than 7,000 structures. All records deposited have been made available for public use and reproduction.

Advancing the program of a national plan sponsored by the Department of the Interior, through a three-party agreement between

the National Park Service, the Library of Congress, and the American Institute of Architects, the Survey continued to function in the conservational capacity of recording first those historic structures in danger of destruction in the States where work relief projects for this purpose could be organized.

SAFEGUARDING THE PUBLIC HEALTH

Working closely with the engineers of the National Park Service, sanitary engineers of the Public Health Service of the Treasury Department have assisted in protecting the health of the 15,000,000 park and monument visitors and that of the approximately 13,000 persons employed during the year by the National Park Service and of the thousands more working for the operators of concessions in the park supplying accommodations to visitors.

As always, great attention was given to providing adequate supplies of pure water and to the proper disposal of sewage.

Notable among the accomplishments in this field were the handling of the sanitation problem arising at the Gettysburg National Military Park during the commemoration of the seventy-fifth anniversary of the Battle of Gettysburg, and the installation of a new sewage treatment plant at Mammoth Cave National Park.

Among the interesting plans submitted were those for sewage treatment plants at Mount McKinley National Park and for a general sewage disposal layout at the North Rim, Grand Canyon National Park.

A special investigation was made of the distribution and use of the reclaimed sewage water at the South Rim of the Grand Canyon, with particular reference to safeguards adopted. Bacteriological analyses of samples of reclaimed sewage-water at the South Rim used for industrial purposes indicate that this water meets the Treasury standards for drinking water. It is, however, never used for domestic purposes.

The water supply problem at Colonial National Historical Park continues to be urgent, through lack of funds to handle the situation adequately.

ACCOMMODATIONS FURNISHED BY CONCESSIONAIRES

The long-established policy of granting concessions for the operation of accommodations for the public in the Federal park areas was continued. Additional study was given to the plan of housing some of the smaller concession operations in Government-owned buildings.

The upward trend of the past three seasons was somewhat checked, the 1938 revenue being slightly less, in most instances, than that for 1937. This was largely the effect of a lessening of business from organized rail tours.

Studies of the concession service of the past year compared with that of 10 years ago show an interesting trend. Before the 1929 depression, substantially all profits of the park operators were earned from furnishing sightseeing transportation and first-class American plan hotel accommodations. Revenue from other sources was immaterial, there being practically no cafeteria, coffee shop, or grill services.

Today the profit-producing facilities are the low-priced cabin accommodations, cafeteria, coffee shop, and grill services. Although the transportation and first-class hotel accommodations still furnish the greater portion of the operators' revenues, they are less self-supporting than the newer types of accommodation.

Under present policies, such items as gasoline and food supplies are sold at the same rate as in the nearest city to the park. Wherever the volume of business made possible a reasonable profit, the same ruling has been applied to purchases at soda fountains and light lunch counters.

Although no unusual or especially large projects were undertaken by the park operators, continued general improvements were under way in all of the parks.

The Virginia Skyline Co., Inc., completed and put into operation the first section of a large cabin development at Big Meadows and opened a new roadside facility for meals and lodging at Dickey Ridge, in the Shenandoah National Park. A lunchroom and gasoline station also were opened at Elk Wallow.

The demands for additional housing accommodations at Mammoth Cave National Park were so insistent that construction of 35 additional cabins is under way.

The development by the Federal Government of the landing field at the Boulder Dam recreational area was completed. Arrangements were made by the park operator for the landing thereon of the cross-country planes of Transcontinental Western Air Lines.

Construction was started on the development, on an experimental basis, of a facility to provide inexpensive overnight accommodations in Sequoia National Park for groups of young people.

An interesting experiment in low-cost housing is under way in Yosemite National Park, where the park operating company (whose president is a member of the National Park Service Committee on Auto Camps and Housekeeping Cabins) is erecting a few cabins each of several types of minimum cost prefabricated housing units. If satisfactory, this development should enable the park operators to provide cabins at a moderate investment and with resultant low charges and a fair rate of return earned.

Cooperation was continued with the Indian Arts and Crafts Board in the promotion of the sale of Indian handicraft in the western

national parks and with the Southern Highland Handicraft Guild in the sale of mountaineer products in the eastern national parks.

Short-term contracts were entered into for the furnishing of limited transportation and saddle-horse services in Death Valley National Monument.

Several of the park operators, with the approval of the Department, made application to the Reconstruction Finance Corporation for loans for the construction of additional facilities. The Mesa Verde Park Co. was successful in securing a loan, and the applications of other park operators are still under consideration.

As of June 30, 1938, there were 140 corporations, firms, or individuals in 49 national parks, national monuments, and other areas under the jurisdiction of the National Park Service operating under contract or permit to furnish accommodations to the public as compared with 131 such concerns as of the beginning of the fiscal year and 89 such concerns as of 10 years before.

Field studies of electric, telephone, water, and sanitation services furnished to the park operators were made at Lassen Volcanic, Mesa Verde, and Shenandoah National Parks and the Oregon Caves National Monument. Rates to be charged for these services will result in new or increased revenue to the United States of approximately \$3,600. These services are furnished to the park operators at a cost which includes depreciation, maintenance, and operating charges.

Field inspections were made of both the park operators' and the Service's buildings in the larger parks. As a result, the following improvements have been made or are in process: the relocation of large gas meters in the natural gas lines serving buildings at Hot Springs National Park; safeguards for oil tanks at Yellowstone National Park; and structural changes for the control of fire in the hotels at Glacier National Park.

Employee safety activities included the preparation and distribution of posters, the establishment of a park safety program which provides a systematic procedure for the reduction of accidents and for the investigation of serious accidents. Progress has been made in the preparation of standards for safe practice to be followed by the Service in construction projects.

NATIONAL CAPITAL PARKS

During the fiscal year 1938 numerous projects of great significance in the development of the ultimate plan for the park system were undertaken, and many events of national importance and interest were held in the National Capital Parks.

Rawlins Square, one of the important small parks of the northwest rectangle, redesigned along strictly formal lines, was completed under P. W. A. authorization.

Important progress was achieved on the roads and trails project for the extension of the George Washington Memorial Parkway, Memorial Avenue to Key Bridge, including the construction of the permanent bridge across Boundary Channel, the temporary bridge over Little River, and the Lee Boulevard connection. Completion of the rough grade over the entire area, with the exception of a small section on Columbia Island, was recorded.

The W. P. A. project for the demolition of the old Brightwood Reservoir and the conversion of the adjacent area in Rock Creek Park into a major recreation center achieved important progress.

The road in the south grounds of the Executive Mansion was re-routed and reconstructed and the low iron fence enclosing the south grounds of the White House was replaced by a higher fence of copper-bearing steel, designed to harmonize with the colonial iron fence enclosing the north grounds.

A permanent flood-control dike north of the Lincoln Memorial Reflecting Pool and in the Washington Monument grounds was constructed by the United States Engineer Office.

Work on the construction of a new modern four-lane steel and concrete single arch bridge to replace the old two-lane bridge over Rock Creek Park in section 4, Rock Creek and Potomac Parkway, advanced beyond the 50-percent completed stage. The equitation field in Rock Creek Park was redesigned, completely regraded, and equipped with new jumps. A bridle path underpass at the Tilden Street Bridge was constructed to abolish the traffic hazard which existed previously at that point. This project also involved the construction of minor bridges over the adjacent mill race.

Events.—An event of principal importance during the year was the National Boy Scout Jamboree, attended by more than 30,000 Scouts from each State of the Union and several foreign countries. The Scouts were encamped in East and West Potomac Parks and the Washington Monument grounds and along the Mount Vernon Memorial Highway. Other events held in the park system during the year included the inauguration of the National Celebration of the Sesquicentennial of the Constitution, with President Roosevelt as principal speaker; the encampment of the Workers Alliance in West Potomac Park during August; the Japanese Cherry Blossom Festival; the President's Cup Regatta; and the National Conservation Rally of the Campfire Girls.

Administration.—During the year 1938 the total appropriations accounted for by National Capital Parks amounted to \$2,555,456.72. In addition, the following four C. C. C. camps were maintained:

NP-6—Fort Hunt, Mount Vernon Memorial Highway.

NP-7—Fort Dupont.

NP-8—Theodore Roosevelt Memorial Island.

SP-6—Garrett Park, beginning April 15, 1938.

Attendance.—The total attendance in the National Capital Parks during the fiscal year was estimated to be approximately 50 million.

CHANGES IN FEDERAL PARK SYSTEM

Establishment of new areas, boundary revisions, and changes in status of existing areas marked continued growth and development of the Federal park system during the 1938 fiscal year. The system now comprises 27 national parks, 73 national monuments, 11 national military parks, 11 national cemeteries, 8 national battlefield sites, 8 national memorials, 1 national recreational area, 1 national historic site, 1 national parkway, 3 national parkway projects, 2 national historical parks, and the National Capital Parks unit, totaling 19,187,933 acres.

OLYMPIC NATIONAL PARK ESTABLISHED

An act passed in the closing hours of the Seventy-fifth Congress gave the Nation the new Olympic National Park of approximately 624,000 acres, including the former Mount Olympus National Monument, Wash. The President's approval of this measure (H. R. 10024 as amended) on June 29, 1938, fulfilled a 34-year dream of conservationists. The measure authorizes the President to add to the park a maximum of 262,292 acres so that the final boundaries may include a total of 898,292 acres.

NEW NATIONAL MONUMENTS

Three new national monuments were added to the system: Capitol Reef National Monument, Utah, established August 2, 1937, by Presidential proclamation; Pipestone National Monument, Minn., established by act of Congress, August 25, 1937 (50 Stat. 804); and Channel Islands National Monument, Calif., established by Presidential proclamation April 26, 1938.

EXTENSION OF NATIONAL PARKS

Congress, by an act of June 20, 1938, extended the boundaries of Hawaii National Park to include, in the Kilauea-Mauna Loa section, an area to the southeast containing a shoreline and one of the few remaining unspoiled native villages on the archipelago.

The boundaries of Hot Springs National Park, Ark., were extended by an act of Congress approved June 23, 1938, making possible acquisition of land to protect the watershed for the probable source of the hot springs from the denudation regarded as inevitable if the West Mountain-Sugar Loaf Mountain extension remains in private hands.

FIRST HISTORIC SITE ESTABLISHED

Salem Maritime National Historic Site, Mass., established March 18, 1938, by designation by the Secretary of the Interior, is the first area of its type established under the important and far-reaching national policy for historic preservation embodied in an act of August 21, 1935 (49 Stat. 666).

LANDS ADDED TO EXISTING FEDERAL PARK AREAS

Net increase to the Federal park and monument system through adjustment of boundaries of existing areas and lands acquired for authorized areas amounted to 1,846,377.363 acres, as follows:

Acadia National Park.—Donations of 706.137 acres increased the total area of the park to 16,646.227 acres.

Black Canyon of the Gunnison National Monument.—By proclamation of May 16, 1938, 100 acres were added to the monument, making a total of 11,197.76 acres.

Blue Ridge Parkway.—Donations of 1,469.69 acres of land, all in the State of North Carolina, and an accurate compilation of the area heretofore acquired resulted in a total area of 4,972.28 acres for this parkway.

Boulder Dam National Recreational Area.—By agreement with the Bureau of Reclamation, approved by the Secretary of the Interior, the National Park Service is charged with the development and supervision of the recreational facilities of this area containing approximately 1,699,573 acres.

Cape Hatteras National Seashore Project.—The War Department transferred 74 acres for this project.

Chickamauga and Chattanooga National Military Park.—Donation of 0.082 acre brought the total of this park to 8,629.212 acres.

Chiricahua National Monument.—By proclamation of June 10, 1938, 6,407 acres were added to the monument, making a total of 10,694.8 acres.

Colonial National Historical Park.—Acquisition of 23.805 acres through donation and purchase resulted in a total of 6,325.765 acres for this national historical park.

Fort Donelson National Military Park.—Transfer of 9.18 acres from the War Department brought the total area to 102.54 acres.

Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park.—Donation of 42.811 acres resulted in a total area of 2,328.091 acres.

Great Smoky Mountains National Park.—Acquisition of 25,913.85 acres through donation and purchase brought the total area to 437,602.65 acres; 26,064 acres still to be acquired.

Hot Springs National Park.—Purchase of 5.815 acres increased the total area to 989.805 acres.

Isle Royale National Park project.—The purchase and donation of 73,605.04 acres brought the total Federally owned area to 112,681.59 acres, 20,723 acres still to be acquired.

Kennesaw Mountain National Battlefield Site.—The acquisition of 477.93 acres brought the total area to 648.03 acres.

Mammoth Cave National Park.—Acquisition of 3,984.85 acres through donation and purchase resulted in a total park area of 38,545.164 acres; 6,764.836 acres still to be acquired.

Petersburg National Military Park.—Purchase and donation of 88.734 acres increased the total area to 1,938.834 acres.

Region III.—Acquisition of 8.04 acres as donation for headquarters site.

Salem Maritime National Historic Site.—Donation of 8.289 acres increased the total area to 8.609 acres.

Statue of Liberty National Monument.—Transfer of 7.88 acres from the War Department increased the total area to 10.38 acres.

Vicksburg National Cemetery.—Acquisition of 80.03 acres by purchase resulted in a total area of 118.190 acres.

Wupatki National Monument.—By proclamation of July 9, 1937, 33,631.20 acres were added to the monument, making a total of 35,865.30 acres.

Yosemite National Park.—Acquisition of 160 acres by purchase increased the total area to 752,904.32 acres.

LEWIS AND CLARK CAVERNS NATIONAL MONUMENT ABOLISHED

Pursuant to an act of August 24, 1937 (50 Stat. 746), the Secretary issued Patent No. 1096218, dated March 16, 1938, to the State of Montana, embracing 1,438.36 acres. This patent includes the 160 acres of land formerly within Lewis and Clark Caverns National Monument, now abolished.

PROPOSED EXTENSIONS OF EXISTING FEDERAL PARK AREAS

By resolution of June 7, 1938, the Senate authorized the Committee on Public Lands and Surveys to investigate, in the summer of 1938, the necessity, suitability, and feasibility of extending the boundaries of Grand Teton National Park, Wyo., to include the Jackson Hole country and an area within Teton National Forest which surrounds Jackson Lake. This will be the second Senate investigation of the project.

Senate resolution agreed to on June 7 authorized and directed the Committee on Public Lands and Surveys of the Senate to conduct a thorough investigation of all questions relating to the suitability and feasibility of creating the Petrified Forest National Park of the area now set apart as Petrified Forest National Monument in Arizona. The investigation is to be conducted during July and August.

The Service has undertaken the acquisition, largely by condemnation, of 7,730 acres of sugar-pine forest for inclusion in Yosemite National Park, Calif., for which money was appropriated in June 1937.

STATUS OF FEDERAL PARK PROJECTS AUTHORIZED BY CONGRESS

Through allocation of \$705,000 of Federal emergency funds and appropriation of \$100,000 by the State of Michigan, 102,567 acres have been purchased for the Isle Royale National Park project at a cost of \$522,481. The remaining funds make possible acquisition of 7,974 acres now under contract for \$150,098 and 10,098 acres in course of condemnation. The act of June 20, 1938, authorizes the addition to the park of lands acquired with emergency funds.

The boundaries of the Everglades National Park project were fixed by the Secretary of the Interior to include a small portion of Key

Largo and a portion of Florida Bay. The project involves more than a million acres, of which 759,520 acres are State-owned and the remainder privately owned. The State of Florida is conducting a campaign to raise funds for purchase of the private lands for donation to the Federal Government.

A civic campaign is under way in Texas to raise funds for the purchase of land necessary for establishment of Big Bend National Park, authorized by Congress by act of June 20, 1935.

An act of August 17, 1937 authorized the establishment of Cape Hatteras National Seashore when title to certain lands on the North Carolina coast within an area of approximately 100 square miles becomes vested in the United States. The Department has designated the boundaries, and the State has undertaken through its department of conservation and development to acquire privately owned lands for transfer to the Federal Government.

Establishment of Saratoga National Historical Park, N. Y., when lands necessary therefor are acquired by donation or with donated funds, is authorized in an act of June 1, 1938. The park would include that part of the Saratoga Battlefield now owned by the State of New York and any additional lands which the Secretary of the Interior may, within 6 months after approval of the act, designate as necessary or desirable.

A joint resolution, approved June 15, 1938, authorized the Secretary of War to transfer to the Department of the Interior the Cape Henry Memorial site in Fort Story Military Reservation, Cape Henry, Va., which commemorates the first landing on American soil, April 26, 1607, of the colonists who established the first permanent English settlement at Jamestown. A formal request for the transfer is being made to the Secretary of War. If the transfer is made the site will be administered as part of Colonial National Historical Park.

The act of June 28, 1938 rerouted the Williamsburg-Jamestown section of the Colonial parkway described in Presidential proclamation of August 22, 1933 (48 Stat. 1708) in a more logical course to connect Governor Markeley's Green Springs Mansion, Carter's Grove Mansion, and the Roswell Mansion, which are proposed for addition to the park. The exact location of the new route extending south from the City of Williamsburg to the James River and along the river and connecting waters to Jamestown Island, will be determined by the Secretary of the Interior. The act also authorizes the Secretary to acquire by donation, purchase, or otherwise, for addition to the park, the Glass House Point area, The Hook, and an enlarged Gloucester Point area.

The Service is acquiring by condemnation 49.15 acres for Ackia Battleground National Monument, Miss., authorized by an act of August 27, 1935 (49 Stat. 897).

It is expected that the establishment of Badlands National Monument, S. Dak., authorized in 1929, will be consummated soon. Only the exchange of State lands within the project for Federal lands outside the area delays establishment.

Twenty-four thousand dollars authorized in 1936 for purchase of lands for Homestead National Monument, Nebr., is being applied for purchase of 160.82 acres.

With an offer made by the Whitman Centennial, Inc., and the Walla Walla Foundation to donate land comprising the site of the Indian Mission established in 1836 by Marcus Whitman, there remains only formal acceptance of title by the Department for establishment of Whitman National Monument, Wash., authorized by an act of June 29, 1936.

PROPOSED NATIONAL PARKS

A bill, H. R. 10435, was introduced in the Seventy-fifth Congress to authorize the establishment of the Kings Canyon National Park. The Kings River region north of Sequoia National Park in California has been urged for inclusion in the national park system since 1890. As a result of a careful study, the boundary lines have now been drawn so as to eliminate important power and irrigation dam sites without sacrificing the outstanding scenic features of the region.

Resolutions from more than 30 organizations and a great number from private individuals were received favoring the proposed park. Now that there is no conflict between the proposed park and the power and irrigation advocates, it is hoped that a better understanding of the proposal may result in the establishment of the park during the next session of Congress.

A bill, H. R. 6599, was introduced by Congressman Brewster to authorize the establishment of the Katahdin National Park in the State of Maine. As a result of a very careful field investigation last fall, a report was compiled on the Katahdin area. Further studies of this region are now being made.

A bill, H. R. 10239, was introduced in Congress to establish the Green Mountain National Park in Vermont. The proposed legislation, which received the approval of the Department, would preserve a section of typical New England landscape.

PROPOSED NATIONAL SEASHORES

The Service has continued its study of approximately 20 areas along the Atlantic, Gulf, Pacific, and Great Lakes shores, which were given a preliminary survey in 1935, as possible national seashores.

PROPOSED NATIONAL MONUMENTS

Negotiations were continued for establishment of a section of the Escalante area along the Colorado River watershed in Utah as a national monument.

Only formal acceptance of title to certain privately owned property is delaying establishment of a national monument on the site of the Tuzigoot ruins near Clarksdale, Ariz. Investigations by archeologists who supervised excavation and restoration of the ruins indicate three major southwestern cultures were present simultaneously in the pre-historic past.

A long, narrow strip of exceedingly white sand on Santa Rosa Island in Escambia County, Fla., which, in geologic terms, is illustrative of a process of aggradation, has been approved for establishment as Santa Rosa National Monument. The major portion of the island, now owned by Escambia County, is in process of transfer to the Federal Government.

The proposed Indian Mounds National Monument, Iowa, containing extraordinary examples of Indian mounds, has been investigated and approved for establishment when the land has been acquired and donated to the Federal Government.

An area of approximately 27,450 acres in New Mexico and Arizona, containing archeological ruins of great scientific importance, has been approved by the Department for establishment as Puerco National Monument. The acquisition of certain necessary lands by local people for donation to the Federal Government has been undertaken.

Areas Investigated During the Fiscal Year for Possible Inclusion in the
Federal Park System

1. Coast Redwoods National Park Area, Calif.
2. Columbia Gorge Recreational Area, Oreg.
3. Flathead National Park Area, Mont.
4. Fort Peck Recreational Area, Mont.
5. Gila National Park Area, N. Mex.
6. Glacial Grooves National Monument, Ohio.
7. Grand Coulee Recreational Area, Wash.
8. Grasslands National Monument, S. Dak.-Nebr.
9. Hart Mountain National Monument, Oreg.
10. Luquillo National Park, Puerto Rico.
11. Newberry Crater National Monument, Oreg.
12. Northern Cascades National Park Area, Wash.
13. Superior National Park, Minn.
14. Palmyra Island National Monument, Territory of Hawaii.
15. Palm Canyon National Monument, Calif.
16. Porcupine Mountains National Park, Mich.
17. Roosevelt Badlands National Monument, N. Dak.
18. San Juan National Park Area, Colo.
19. San Juan Islands National Monument, Wash.
20. San Juan National Monument, Puerto Rico.

21. Ship Island National Monument, Miss.
22. Waimea Canyon National Park, Territory of Hawaii.
23. Wind River National Park, Wyo.
24. Cumberland Gap National Historical Park, Tenn.-Ky.-Va.

CIVILIAN CONSERVATION CORPS ACTIVITIES

The fiscal year closed with 294 C. C. C. camps operating under technical supervision of the Service, compared with 418 on July 1, 1937. Camps in operation at the close of the year included 78 on continental national parks and 216 on State, county, and metropolitan parks and recreation areas and recreational demonstration areas. During the year the Corps carried on a general program of conservation and recreational development involving construction of such facilities as roads, trails, dams, cabins, and simple park structures, water and sanitary systems, for both extended and day use of areas.

Of the 5,000 enrollees authorized by the Civilian Conservation Corps Act of June 28, 1937, for projects in the Territories and insular possessions, 1,200 were allotted to the Department of the Interior.

In the Territory of Hawaii, 800 men are enrolled in the Corps, 200 of whom are at work in Hawaii National Park and 600 on lands of the Territorial government. Wild sheep, goats, and boar, which destroyed vegetation and prevented natural regeneration were materially reduced in number, and important areas were fenced and planted. At the end of the year, 10,725,000 trees had been planted on 21,450 acres since the program was started.

In the Virgin Islands, 300 enrollees were authorized for St. Thomas and 100 for St. Croix. Old roads were widened, realigned, and put in condition, and general conservation work was performed.

For the first time in the history of the C. C. C. enrollees were transported from the States to a Territorial possession. Two hundred men selected from Oregon and Washington were organized for 1938 summer work in a camp established in Mount McKinley National Park, Alaska.

RECREATIONAL DEMONSTRATION AREAS

Development of 46 recreational demonstration projects on 62 areas in 24 States was continued with both E. R. A. and C. C. C. labor employed. Forty-eight of sixty-four organized camps under construction on 34 of these areas were scheduled to be completed and in use for the summer of 1938. Thirty-one of these were finished before the end of the fiscal year. These facilities, which received 100,000 camper-days use and provided recreation for 1,000,000 day-use visitors in 1937, include adequate systems of control roads, water and sanitary systems, central administration and service groups, facilities for centralized feeding, decentralized camping, and such activities as swimming, boating, hiking, and picnicking. General

conservation treatment is also applied on each area, and in some instances certain portions are set aside as wildlife refuges.

The recreational demonstration area program also includes the laying out of 13 wayside parks contiguous to main highways in Virginia and South Carolina for the use of travelers. These are being equipped with picnic tables and benches, water, and sanitary facilities.

Developments under this program have been carried on by 8,000 relief workers and 2,300 C. C. C. enrollees. A total of 352,874 acres of land have been acquired for this purpose, title to 253,361 acres of which was cleared in the 1938 fiscal year.

EMERGENCY RELIEF ACT PROJECTS

E. R. A. Federal and non-Federal projects in operation by the Service totaled 65 at the close of the fiscal year, compared with 84 at the end of the 1937 fiscal year. Curtailment of funds in the period July 1 to December 31, 1937, necessitated termination of operations on 34 non-Federal projects, and on June 30, 1938, only four non-Federal E. R. A. projects remained under Service supervision.

The Service received funds from the Emergency Relief Appropriation Act of 1937, and the Emergency Relief Supplementary Appropriation Act, approved March 2, 1938, for land acquisition and development and research projects in 9 national parks, 4 national military parks, 9 national monuments, 1 national historical park, 44 recreational demonstration areas, 2 parkways, 1 beach erosion control project, 20 State, 3 county, and 12 municipal park areas. In addition, there were 7 nonconstruction projects in 3 States and the District of Columbia employing white-collar research workers. These appropriations and projects gave employment to an average of 10,500 relief workers, of which 7,500 were local workers and 3,000 workers quartered in subsistence camps operated by the Service. Relief workers were also employed by contractors on some of these Service projects.

UNITED STATES TRAVEL BUREAU

A bill to promote travel in the United States through the United States Travel Bureau, H. R. 9212, failed to pass in the Seventy-fifth Congress. Passed by the Senate, the bill remained in the House Committee on Interstate and Foreign Commerce at the hour of adjournment.

The Bureau continued to function on an emergency basis and extended its activities. During the year the name was changed from Tourist to Travel Bureau.

Thirty-five hundred dollars donated by the American Express Co. for the work of the Bureau was accepted by the Department in July 1937.

THE PARK, PARKWAY, AND RECREATIONAL-AREA STUDY

During the year arrangements were completed in 43 States for the conduct of this study authorized under Public 770½, Seventy-fourth Congress, in cooperation with established State recreation and planning agencies. Tentative final State reports were completed by Virginia, Illinois, Mississippi, Nevada, Louisiana, Tennessee, and Pennsylvania. These reports, containing preliminary plans and recommendations for meeting the recreational needs of each State, were reviewed and concurred in by the Service as the basis for further study and returned to the States with detailed suggestions for their completion. Indiana also submitted its tentative final report, which is being studied.

The completed reports will constitute comprehensive plans to serve as a guide in coordinating all recreational areas and agencies as a complementing and supplementing recreation system for each State. Later, regional and national studies will be based on these State plans. Information on Federal lands and facilities available for recreation was received from other Federal agencies in response to this Department's requests.

COOPERATION WITH STATES EXTENDED

During the year the Service has cooperated with the United States Corps of Engineers and State planning commissions and conservancy districts in planning proper recreational use of lakes and pools created by flood-control projects.

In addition to assisting in planning new parkway developments, the Service also has given advice to several States on interstate compacts relating to the establishment, development, and operation of interstate parks and parkways.

Three publications bearing on State and local park development work were issued by the Service in the 1938 fiscal year. *Park and Recreation Structures* discusses and pictures by drawings and photographs structural undertakings appropriate to natural park and recreational area environments. This 600-page publication was issued in three parts, subtitled "Administration and Basic Service Facilities," "Recreational and Cultural Facilities," and "Overnight and Organized Camp Facilities." The 1937 Yearbook—*Park and Recreation Progress*—contains a report on the progress of State cooperative work in park and recreational development, and articles on various allied subjects. *Municipal and County Parks in the United States, 1935*, was based upon an original study made by the Service in cooperation with the National Recreation Association.

MAINTENANCE OF FEDERAL BUILDINGS

At the close of the fiscal year, the National Park Service was responsible for the maintenance and operation of 21,122,615 square

feet of floor space in the District of Columbia, of which 18,303,567 square feet was in 46 Government-owned buildings, and 2,819,048 square feet in 64 privately owned buildings. Similar service was rendered in 11 Government-owned office buildings, having a total floor area of 1,267,561 square feet, located in 9 other cities. Seven special structures are also maintained by the branch of the Service engaged in building maintenance. The only noteworthy changes during the year were the acquisition of the Federal Trade Commission Building, transferred upon completion by the Treasury Department, effective March 1; and the demolition of Temporary Building F.

The White House continued to receive the most careful maintenance.

Personnel employed and funds expended incident to providing this service were as follows:

	Person- nel	Expenditures		
		Gross	Reimburs- able	Net
Buildings in the District of Columbia.....	1 5,388	\$9,687,071	\$2,592,582	\$7,094,489
Buildings outside the District of Columbia.....	² 315	585,230	3,726	581,504
Total.....	5,703	10,257,031	2,577,366	7,679,665

¹ Includes 587 temporary.

² Includes 16 temporary.

The act making appropriations for the Service authorized the expenditure of not to exceed \$500,000 for major repairs and improvements. Among the projects accomplished with this fund were the replacement of certain defective concrete flooring and the installation of new wiring in the Navy and Munitions Buildings; the replacement of a portion of the obsolete lighting fixtures in those buildings and in the building at 1300 E Street NW., with fixtures of modern design; procurement of a turbine-driven boiler feed pump, the construction of catwalks, and the elimination of a dangerous condition on the coal conveyor at the Central Heating Plant; the installation of emergency exit platforms in the elevator shaft at the Washington Monument; the replacement of the circulating pumps at Columbus Fountain; the installation of venetian blinds in a portion of the Internal Revenue Building; the installation of a telephone system in the steam distribution tunnels radiating from the Central Heating Plant; the installation of flood-control pumps, actuated by independent power supply, in the new buildings along Constitution Avenue; and improvements to the ventilating systems in certain elevator penthouses and electrical vaults.

The service of the Central Heating Plant was extended to the Federal Trade Commission Building, the new Police Court Building in Judiciary Square, the National Gallery of Art, the new building of the Bureau of Engraving and Printing, the Wilkins Building, and the building at 1510 H Street NW. The addition of these buildings increased the potential connected load by 141,500 pounds of steam per hour. Owing to the mild winter, only 95,472 tons of coal were consumed at the plant, the total steam generated being 2,056,099,000 pounds.

The operation of the guard school was continued, 20 hours of instruction being given each student. Also, a course of instruction was instituted for elevator conductors, comprising five 1-hour lectures and demonstrations.

SPACE CONTROL

At the close of the fiscal year, space aggregating 14,354,352 net square feet was occupied by Government agencies in 110 Government-owned buildings in the District of Columbia, housing 79,199 employees, under authorization from the National Park Service, the Service being responsible for allocation and proper utilization of space in nearly all of the Federal buildings in the District. Also, a total of 3,245,775 net square feet of space in 118 privately owned buildings, housing 27,657 employees, was being leased at an annual rental of \$2,906,654.37, by or with the approval of the National Park Service, making a total of 17,600,127 square feet of space occupied by 106,858 employees in 228 buildings.

Forty changes in space allocations in Government buildings were approved, and 507 moves were accomplished.

CONCLUSION

The dual function of the National Park Service as specified by law—that of conserving the intricate and involved inter-relationship of all the organisms that combine to make up the natural features of a national park and at the same time permitting man to come into and enjoy that park—presents one of the most complex biological problems known.

The conflict between complete preservation and wise use is always present, and to solve the problem in a manner that will give the best future results requires an unusual degree of sound judgment, administrative ability, and technical skill.

Since 1933, a prodigious amount of new work has come to the Service through consolidation of Federal park supervision, emergency activities, and natural growth. As a result of a shortage of positions in technical lines in the industrial world, the Service fortunately was able to employ a number of excellently trained specialists of high

ideals. As the amount of emergency funds available to the Service has decreased, the Service has been forced to dispense with the services of many of these men and women and it has not been possible to secure a commensurate number of civil-service positions to carry on the work as effectively as desired.

One of the most serious problems facing the Service today, therefore, is the necessity of obtaining an adequate basic permanent personnel in all administrative, protective, and technical lines to carry on the administration, protection, maintenance, and improvement of the areas in the Federal park system in such a manner as to provide the greatest possible degree of use and enjoyment for the people, while preserving the areas for coming generations.

Not only should the personnel of long-established parks and monuments be increased to meet the needs incident to expanded popular use, but permanent personnel should replace emergency personnel in the administration and developing of the military and historical areas more newly assigned to Service supervision.

Unless the situation is taken care of in the near future, it may become acute, as already indicated by the contraction of the emergency personnel organizations begun 2 years ago.

TABLE I.—Holdings Acquired for National Park and Monument Purposes

Parks, monuments, and parkways	Holdings acquired from July 1, 1937, through June 30, 1938				
	Holdings acquired by purchase		Holdings acquired otherwise than by purchase		Total holdings acquired through June 30, 1938, in acres
	Government funds	Donated funds	Area in acres	How acquired	Area in acres
Acadia National Park.....				Donation.....	706,137
Black Canyon of the Gunnison National Monument.....				do.....	120,000
Blue Ridge Parkway.....				do.....	1,469,690
Boulder Dam Recreational Area.....				do.....	15,930
Chickamauga and Chattanooga National Military Park.....				do.....	23,082
Colonial National Historical Park.....	\$475.00		1,500	do.....	23,805
Fredericksburg and Spotsylvania National Military Park.....				do.....	42,811
Glacier National Park.....	13,607.17	\$13,607.17	480,520	Exchange.....	680,000
Grand Canyon National Park.....				Donation.....	639,750
Grand Smoky Mountains National Park.....				Do.....	2,900
Isle Royale National Park.....	501,153.07		25,274.100	Do.....	73,602,140
Kennesaw Mountain National Battlefield Park.....	9,852.00		5,815	Do.....	963,380
Mammoth Cave National Park.....	373,573.69		477,930	Do.....	3,984,850
Petersburg National Military Park.....	17,335.00		3,021,470	do.....	88,734
Salem Maritime National Historical Site.....	125,378.00		19,318	do.....	8,289
Vicksburg National Cemetery.....	3,650.00			Do.....	80,030
Wupatki National Monument.....	78,940.00			Do.....	7,275,310
Yosemite National Park.....	24,303.14	17,130.50	275,590	Do.....	275,590
Acreage acquired in other areas prior to July 1, 1937.....					
Total.....	1,148,207.07	30,737.67	103,238,413		115,254,413
Grand total.....					992,037,900
					699,848,817
					1,107,292,373

¹ Includes 27,535 acres outside of the minimum area required for the establishment of the park.

TABLE 2.—Automobile and Motorcycle Licenses Issued and Revenues Received, Fiscal Years 1937–38

Name of park	1937			1938		
	Auto-mob-iles	Motor-cycles	Revenue	Auto-mob-iles	Motor-cycles	Revenue
Crater Lake.....	42,754	-----	\$42,754	45,719	-----	\$45,719
General Grant.....	10,002	-----	10,002	13,500	-----	13,500
Glacier.....	30,662	86	30,748	33,624	60	33,684
Grand Canyon.....	65,601	-----	65,601	80,146	-----	80,146
Lassen Volcanic.....	14,051	11	14,062	15,619	-----	15,619
Mesa Verde.....	6,093	-----	6,093	6,082	-----	6,082
Mount Rainier.....	53,693	-----	53,693	54,144	-----	54,144
Sequoia.....	33,908	-----	33,908	35,745	-----	35,745
Yellowstone.....	110,429	348	331,635	117,070	487	351,698
Yosemite.....	99,732	206	199,670	99,766	226	199,757
Zion.....	37,620	-----	37,620	37,372	-----	37,372
Total.....	504,545	651	825,786	538,787	773	873,466

TABLE 3.—Appropriations for Administration, Protection, and Maintenance, Expenditures Therefrom, and Revenues, Fiscal Year 1938

Name of park	Appropriated	Expenditures and obligations	Revenues received
Acadia.....	\$47,710.00	\$46,457.95	\$524.00
Bryce Canyon.....	12,350.00	12,513.96	-----
Carlsbad Caverns.....	103,000.00	99,481.22	304,326.52
Crater Lake.....	73,730.00	77,594.16	49,383.32
General Grant.....	17,570.00	17,488.09	14,857.52
Glacier.....	189,120.00	184,468.42	42,409.85
Grand Canyon.....	118,500.00	119,454.07	99,753.75
Grand Teton.....	25,530.00	25,191.72	499.47
Great Smoky Mountains.....	76,500.00	74,314.40	7,759.14
Great Smoky Mountains (land acquisition), deficiency.....	743,265.29	-----	-----
Hawaii.....	50,100.00	50,931.29	1,176.50
Hot Springs.....	72,500.00	71,173.50	38,925.77
Lassen Volcanic.....	35,000.00	36,476.12	16,458.74
Mammoth Cave.....	-----	-----	14.12
Mesa Verde.....	55,540.00	56,959.53	6,588.27
Mount McKinley.....	29,000.00	27,888.46	336.16
Mount Rainier.....	141,480.00	150,920.53	57,115.41
National Capital Parks, U. S.....	176,000.00	169,516.88	11,682.04
National Capital Parks, D. C.....	918,880.00	912,830.20	-----
Platt.....	20,600.00	20,231.18	1.00
Rocky Mountain.....	82,000.00	82,859.29	2,304.13
Sequoia.....	104,100.00	108,903.80	47,483.63
Shenandoah.....	58,000.00	57,932.64	5,456.76
Wind Cave.....	18,520.00	17,614.60	12,041.23
Yellowstone.....	411,000.00	427,638.26	440,555.05
Yosemite.....	301,600.00	318,437.07	287,358.13
Zion.....	40,450.00	42,976.23	37,909.97
National Historical Parks and Monuments.....	127,000.00	130,149.45	773.17
National Monuments.....	205,600.00	196,876.35	1,350.08
Homestead National Monument.....	124,000.00	18,114.15	-----
Oregon Caves National Monument.....	20,000.00	18,560.58	-----
National military parks, battlefields, monuments, and cemeteries.....	300,660.00	276,421.54	12,262.90
Kennesaw Mountain National Battlefield Park.....	30,000.00	28,605.74	-----
Boulder Dam recreational area.....	45,000.00	44,481.17	15.00
National Park Service.....	196,940.00	185,417.66	159.60
Public buildings and grounds.....	7,706,280.00	8,144,855.08	4,923.68
General expenses, N. P. S.....	27,000.00	27,011.41	-----
Forest protection and fire prevention.....	100,000.00	83,566.60	-----
Emergency reconstruction and fighting forest fires.....	40,000.00	44,708.03	-----
Emergency reconstruction and fighting forest fires, deficiency.....	40,000.00	-----	-----
Construction of roads and trails.....	14,500,000.00	13,983,615.10	-----
Blue Ridge and Natchez Trace Parkways.....	16,000,000.00	16,038,127.07	137.00
Historic sites and buildings.....	24,000.00	21,323.25	-----
Investigation and purchase of water rights.....	25,000.00	17,078.37	-----
Miscellaneous.....	-----	-----	19.95
Total.....	23,333,525.29	17,034,165.72	1,504,561.84

¹ Available until expended.² Represents expenditures only.

TABLE 4.—Summary of Appropriations for the Administration, Protection, and Improvement of Areas Under the Jurisdiction of the National Park Service, Together With the Revenues Received, for the Fiscal Years 1917 ¹ to 1938, Inclusive

Year	Department	Appropriation	Revenues
1917	Interior Department.....	\$537,356.67	
	War Department.....	247,200.00	
		\$784,566.67	\$180,652.30
1918	Interior Department.....	530,680.00	
	War Department.....	217,500.00	
		748,180.00	² 217,330.55
1919	Interior Department.....	963,105.00	
	War Department.....	50,000.00	
		50,000.00	
1920		1,013,105.00	196,678.03
1921		907,070.76	316,877.96
1922		1,058,969.16	396,928.27
1923		1,433,220.00	432,964.89
1924		1,446,520.00	513,706.36
1925		1,892,601.00	663,886.32
1926		3,027,657.00	670,920.98
1927		3,258,409.00	826,454.17
1928		3,698,920.00	703,849.60
1929		4,889,685.00	808,255.81
1930		4,754,015.00	849,272.95
1931		7,813,817.18	1,015,740.56
1932		12,113,435.00	940,364.79
1933		12,831,250.00	820,654.19
1933-35		10,640,620.00	628,182.06
1934		53,402,249.00	
1935		10,983,689.00	731,331.80
1936		12,461,513.00	907,189.96
1937		16,686,090.00	1,136,533.68
1938		18,190,490.00	1,398,691.66
		23,333,525.29	1,504,561.84

¹ For summary of appropriations and revenues prior to 1917 see 1920 Annual Report, p. 359.

² The revenues from the various national parks were expendable during the years 1904 to 1918, inclusive, with the exception of those received from Crater Lake, Mesa Verde, and Rocky Mountain National Parks, the revenues from which were turned into the Treasury to the credit of miscellaneous receipts.

TABLE 5.—Forest-fire Statistics, Calendar Year 1937

Name	Classification				Point of origin				Causes of fires									
	A, ¼ acre or less	B, be- tween ¼ and 10 acres	C, 10 acres or over	Total, all classes, A, B, C	Inside parks		Outside parks		Light- ning	Camp- fires	Smok- ers	De- bris burn- ing	Incen- diary	Lum- ber- ing	Rail- roads	Mis- cella- neous	Total man- caused	Grand total
					On Gov- ern- ment land	On private land	En- tered park	Con- fined to out- side areas										
	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number
REGION I	National parks:																	
	Acadia.....	2	6	1	7	2			5		6	2	19	1		1	7	7
	Great Smoky Mountains.....	11	19	5	26	12	3	1	10		1	8	22			2	25	26
	Mammoth Cave.....	2	28	6	45	28	10	2	5		2	9				4	45	45
	Shenandoah.....		9	8	19	9		4	6		1	7	6			4	19	19
	Military and historical parks:																	
	Chickamauga-Chattanooga.....	5	3	4	12	10		2			9		2		1		12	12
	Colonial.....	4	3	3	10	5	1	1	3		9	1					10	10
	Fredericksburg.....		1		1				1		1						1	1
	Morristown.....	2		2	2	2					2						2	2
	Petersburg.....			2	2						1	1					2	2
	Shiloh.....	1	4	1	6	4			2		3						6	6
	Vicksburg.....	3	3	2	6	3		3			4					1	6	6
	National Capital parks.....	1	2	1	4	3		1			2						4	4
	Blue Ridge Parkway.....		2	3	6	1			5		1	1		1			4	4
Total.....	32	80	34	146	79	14	14	39	1	5	49	20	53	1	2	15	145	146
REGION II																		
	National parks:																	
	Grand Teton.....	23		1	24	22			2	6	5	10	2			1	18	24
	Rocky Mountain.....	2			2	2				2							2	2
	Yellowstone.....	37	4	2	43	41			2	18	6	19					25	43
Total.....	62	4	3	69	65			4	26	11	29	2			1	43	69	

REGION III												
National parks:												
Grand Canyon.....	20	3	23	22	---	---	1	17	2	3	1	23
Hot Springs.....	---	2	2	2	---	---	---	5	---	2	---	2
Mesa Verde.....	5	---	5	3	---	---	2	---	---	---	---	5
Plat.....	4	---	4	4	---	---	---	---	4	---	---	4
National monuments:												
Bandelier.....	---	2	3	3	---	---	---	2	---	1	---	1
Saguaro.....	5	3	8	8	---	---	---	8	---	---	---	8
Total.....	34	10	45	42	---	---	3	32	2	10	1	45
REGION IV												
National parks:												
Bryce Canyon.....	4	---	4	4	---	---	---	---	---	2	2	4
Craier Lake.....	9	1	10	10	---	---	---	9	---	---	---	10
General Grant.....	7	---	7	2	---	---	4	2	1	3	1	7
Glacier.....	26	4	31	25	---	---	3	24	1	---	---	31
Lassen Volcanic.....	7	---	8	6	---	---	2	6	---	2	---	8
Mount Ranier.....	9	---	9	9	---	---	---	1	---	1	---	9
Sequoia.....	11	4	15	13	---	---	2	7	3	5	---	8
Yosemite.....	23	10	35	35	---	---	---	12	3	18	1	35
Zion.....	1	---	1	1	---	---	---	1	---	---	---	1
National monuments:												
Lava Beds.....	1	1	6	4	---	---	2	1	1	2	2	6
Pinnacles.....	---	---	1	---	---	---	1	---	---	---	---	1
Total.....	100	20	127	109	---	---	14	69	10	33	8	127
Grand total.....	228	114	387	295	---	---	60	128	23	121	31	387

TABLE 5.—Forest-fire Statistics, Calendar Year 1937—Continued

Name	Burned area inside parks (nearest whole acre)				Timber destroyed inside parks			Cost of fire suppression (to nearest whole dollar)								Value of C. C. C. contribution
	Timber	Brush	Grass	Total	Gov-ern-ment	Pri-vate	Total	Per-sonal serv-ices	Supplies, trans-porta-tion, etc.	Equip-ment	Indi-rect costs pro-rated	Total	Salaries or park employ-ees not paid from forest-fire fund	Grand total	C. C. C. man-days contrib-uted	
REGION I																
National parks:																
Acadia.....	1			1												
Great Smoky Mountains.....	88	1	4	93				9	1	168		168	112	280	1,525	2,619
Mammoth Cave.....	150		53	203			2					10	105	115	688	1,376
Shenandoah.....	173		12	185									17	17	300	643
Military and historical parks:																
Chickamauga-Chattanooga.....	140		1	141												
Colonial.....		3	4	7						10		10	30	40	69	129
Fredericksburg.....															58	113
Morristown.....															14	23
Petersburg.....																
Shiloh.....			16	16											7	16
Vicksburg.....			6	6									5	5	34	61
National Capital parks.....	1	1	5	7									1	1	23	40
Blue Ridge Parkway.....	6			6											9	21
Total.....	559	5	101	665	2		2	9	1	178		188	287	475	3,386	6,501
REGION II																
National parks:																
Grand Teton.....											11	11	32	43	494	769
Rocky Mountain.....									24		24	24	1	25	2	4
Yellowstone.....	5			5	16		16	51	25	92		168	267	435	825	1,326
Total.....	5			5	16		16	51	49	92	11	293	300	503	1,321	2,099
REGION III																
National parks:																
Grand Canyon.....	2			2												
Hot Springs.....	2			2					86			86	62	148	76	163
Mesa Verde.....													15	15	3	5
Platt.....													1	1	1	2

TABLE 6.—Interpretational Activities of the Branch of Research and Education, National Park Service

National parks and monuments	Guided trips		Lectures		At- tended exhibits	Unat- tended ex- hibits	Total contacts	Total park visi- tors
	Num- ber	Attend- ance	Num- ber	Attend- ance				
Acadia.....	137	27,826	115	19,071	465	-----	47,362	450,000
Bryce Canyon.....	68	9,960	154	17,069	15,238	-----	42,267	97,162
Carlsbad Caverns.....	-----	216,316	-----	11,359	-----	-----	227,675	216,316
Crater Lake.....	157	2,356	358	24,277	56,340	-----	83,003	194,025
General Grant.....	10	262	11	1,701	3,500	-----	5,463	152,090
Glacier.....	353	8,493	220	15,062	4,762	-----	28,317	212,106
Grand Canyon.....	378	31,386	1,355	141,675	170,339	2,377	345,777	318,501
Grand Teton.....	39	1,020	46	9,060	18,132	-----	28,212	73,559
Hawaii.....	262	8,404	215	14,567	26,989	33,742	83,702	199,833
Hot Springs.....	1	50	10	715	11,389	-----	12,154	119,888
Lassen Volcanic.....	221	7,406	83	16,680	33,103	2,000	59,189	80,619
Mesa Verde.....	271	31,807	36	10,521	28,250	300	70,878	27,650
Mount McKinley.....	3	110	37	947	-----	-----	1,057	1,354
Mount Rainier.....	720	14,213	526	40,191	224,280	-----	278,684	394,038
Rocky Mountain.....	178	4,652	249	16,455	30,514	-----	51,621	526,096
Sequoia.....	126	5,477	540	128,870	29,836	-----	164,183	258,160
Wind Cave.....	-----	12,441	-----	-----	-----	-----	12,441	12,441
Yellowstone.....	1,536	94,879	2,016	691,700	670,464	8,617	1,465,660	484,490
Yosemite.....	625	57,129	2,325	422,966	340,563	-----	820,658	445,215
Zion.....	47	8,429	221	21,549	41,409	4,500	75,887	142,612
National Capital Parks.....	58	3,932	75	22,257	1,494	1,000	28,683	-----
Great Smoky Mountains.....	7	23	2	1,200	-----	-----	1,223	675,519
Mammoth Cave.....	-----	81,925	-----	-----	-----	-----	81,925	131,815
Southwestern Monuments.....	17,534	98,635	10,168	58,312	-----	145,604	302,551	289,071
Cedar Breaks.....	-----	-----	-----	-----	2,109	-----	2,109	14,768
Death Valley.....	1	20	149	6,922	-----	700	7,642	57,064
Dinosaur.....	-----	-----	2	314	-----	-----	314	6,502
Lava Beds.....	1,238	5,822	22	4,174	25,388	8,141	43,525	29,985
Lehman Caves.....	413	2,327	-----	-----	-----	-----	2,327	3,071
Muir Woods.....	1	60	5	302	2,198	-----	2,560	77,622
Oregon Caves.....	-----	-----	511	10,815	2,150	105	13,070	56,011
Petrified Forest.....	-----	-----	-----	-----	113,629	6,700	120,329	144,213
Pinnacles.....	-----	-----	9	301	-----	-----	301	19,018
Scotts Bluff.....	261	1,628	794	8,072	26,957	-----	36,657	81,353
Timpanogos Cave.....	927	11,947	-----	-----	-----	-----	11,947	11,947
Boulder Dam.....	59	1,167	1,835	24,484	18,906	-----	44,557	568,104
Total.....	25,630	750,132	22,088	1,741,588	1,898,404	213,786	-----	-----

Total of contacts by educational services, 4,603,910.

Total of park visitors in 36 park areas having interpretative services, 6,572,248.

Percentage of park visitors served by the educational activities, 70 percent.

TABLE 7.—Office Buildings in the District of Columbia Maintained, Operated, and Protected by the National Park Service

Building	Location	Government owned gross floor area	Rented net floor area
Agricultural Annex.....	12th and C Sts. SW.....	86,000	-----
Agriculture Administration.....	The Mall at 13th St. SW.....	307,692	-----
Agriculture Mechanical Shops.....	Constitution Ave. and 13th St. NW.....	32,058	-----
Agriculture, South.....	Independence Ave., 12th, and 14th Sts. SW.....	2,056,430	-----
Archives.....	Constitution Ave., 7th, and 9th Sts. NW.....	1,173,557	-----
Arlington.....	Vermont Ave. and H St. NW.....	575,000	-----
Army Medical Museum.....	7th St. and Independence Ave. SW.....	83,938	-----
Atlantic ¹	928-930 F St. NW.....	-----	38,337
Barber & Ross ¹	11th and G Sts. NW.....	-----	² 30,750
Barr ¹	910 17th St. NW.....	-----	32,085
Bureau of Fisheries.....	6th St. and Independence Ave SW.....	39,131	-----
C St. NW., 2115.....	-----	35,000	-----
Central Heating Plant.....	12th, 13th, C, and D Sts. SW.....	-----	-----
City Club.....	1320 G St. NW.....	-----	48,610
Civil Service.....	7th, 9th, F, and G Sts. NW.....	246,244	-----
Commerce.....	Constitution Ave., 14th, 15th, and E Sts. NW.....	1,605,066	-----

See footnotes at end of table.

TABLE 7.—Office Buildings in the District of Columbia Maintained, Operated, and Protected by the National Park Service—Continued

Building	Location	Government owned gross floor area	Rented net floor area
Connecticut Ave., 815.....	Between I. C. C. and Labor Buildings.....	234, 100	² 119, 800
Connecting Wing.....	1322 New York Ave. NW.....		18, 000
Daily News.....	12th and G Sts. NW.....		15, 243
De Moll ²	6th St. and Maine Ave. SW.....	231, 771	
E Building.....		274, 373	
E St. NW., 1300.....			7, 544
E St. NW., 1345 ¹	West Executive Ave.....	40, 000	
Executive Office.....		20, 369	
F St. NW., 1723-1725.....			² 53, 676
F St. NW., 1724.....	101 Indiana Ave. NW.....	278, 700	
Federal Home Loan Bank Board.....	Constitution Ave., 6th, and 7th Sts. NW.....	303, 000	
Federal Trade Commission.....			27, 200
Florida Ave. NE., 60.....			3, 540
G St. NW., 1328 ¹			15, 000
G St. NW., 1333.....			16, 896
G St. NW., 1338-1340.....			3, 190
G St. NW., 1342 ¹			² 93, 929
G St. NW., 1712.....		8, 166	
G St. NW., 1712 (annex).....	Kansas Ave. & Upshur St. NW.....		43, 723
Garage (Veterans' Administration).....	3d and Canal Sts. SW.....	48, 000	
Garage.....	1126 21st St. NW.....		² 90, 788
Garage (White House).....	21st St. and Virginia Ave. NW.....	36, 000	
Garage (Interior).....	24th and M Sts. NW.....		² 48, 800
Garage.....	Judiciary Square.....	196, 554	
General Accounting Office.....			8, 738
H St. NW., 1510.....			7, 068
H St. NW., 1712 ¹			² 199, 344
H St. NW., 1825.....	18th St. and Pennsylvania Ave. NW.....		² 95, 091
Hurley-Wright.....			24, 000
I St. NW., 1500.....			² 17, 700
I St. NW., 1624.....		25, 270	
Independence Ave. SW., 310.....		4, 239	
Independence Ave. SW., 816.....		17, 408	
Independence Ave. SW., 908.....	C, E, 18th, and 19th Sts. NW.....	1, 308, 300	
Interior.....	E, F, 18th, and 19th Sts. NW.....	726, 535	
Interior, North.....	Constitution Ave., 10th, and 12th Sts., NW.....	1, 281, 000	
Internal Revenue.....	12th St. and Constitution Ave. NW.....	456, 700	
Interstate Commerce.....	Constitution Ave., 9th and 10th Sts. NW.....	1, 237, 000	
Justice.....			15, 000
K St. NW., 1435.....			² 20, 000
K St. NW., 1437.....			10, 632
K St. NW., 1518 ²			28, 000
Kalorama Rd., 1700.....			38, 084
Kalorama Rd., 1701 ¹			21, 000
Kalorama Rd., 1724.....			20, 397
L St. NW., 1709.....	14th St. and Constitution Ave. NW.....	447, 000	
Labor.....	1028 Connecticut Ave. NW.....		49, 416
La Salle ¹	1729 New York Ave. NW.....		² 25, 975
Lemon.....	1523 L St. NW.....		22, 924
Lenox ³			9, 317
M St. NW., 2214-16.....			² 24, 309
Massachusetts Ave. NW., 2000.....			37, 937
Mather ^{1, 3}	916 G St. NW.....		10, 683
McCrary ¹	824-26 7th St. NW.....		67, 062
McKinley Park ³	17 buildings, American University Park.....		97, 378
Moses ¹	11th and F Sts. NW.....		
Munitions.....	Constitution Ave., 19th and 21st Sts. NW.....	851, 490	
National Theater ^{2, 3}	1325 E St. NW.....		16, 000
Navy.....	Constitution Ave., 17th and 19th Sts. NW.....	949, 182	
Ouray ^{1, 3}	801 G St. NW.....		21, 068
Pennsylvania Ave. NW., 1778.....			² 207, 550
Post Office (new).....	13th St. and Pennsylvania Ave. NW.....	840, 000	
Post Office (old).....	12th St. and Pennsylvania Ave. NW.....	377, 951	
Potomac Park Apartments.....	306 21st St. NW.....	108, 000	
Printcraft ^{1, 3}	930 H St. NW.....		61, 811
Procurement Division.....	8th and D Sts. SW.....	886, 750	
Public Health.....	Constitution Ave., 19th and 20th Sts. NW.....	79, 931	
Rizik ^{1, 3}	1737 L St. NW.....		15, 983
South Capitol St., 401.....			55, 080
Standard Oil ^{1, 3}	261 Constitution Ave. NW.....		36, 469
State Department.....	17th St. and Pennsylvania Ave. NW.....	440, 250	
Tariff Commission.....	7th, 8th, F, and F Sts. NW.....	140, 118	
Temporary No. 2.....	19th and D Sts. NW.....	78, 240	
U St. NW., 1331-41 ³			² 85, 725
Vermont Ave. NW., 1001 ³			² 119, 000

See footnotes at end of table.

TABLE 7.—Office Buildings in the District of Columbia Maintained, Operated, and Protected by the National Park Service—Continued

Building	Location	Government owned gross floor area	Rented net floor area
Vermont Ave. NW., 1025.....			54,696
Vermont Ct. NW., 1126.....			13,631
Walker.....	734 15th St. NW.....		66,000
Walker-Johnson.....	1734 New York Ave. NW.....		² 110,312
Washington Auditorium.....	19th St. and New York Ave. NW.....		² 94,000
Wilkins.....	1514 H St. NW.....	54,000	
Willard.....	513-15 14th St. NW.....		26,685
Winder.....	17th and F Sts. NW.....	63,880	
7th St. NW., 425.....			7,000
8th St. SW., 215.....		5,970	
10th St. NW., 1918.....			48,799
12th St. SW., 224.....		13,204	
14th St. NW., 509 ¹			6,540
14th St. NW., 1840.....			30,500
14th St. NW., 2303 ³			66,957
15th St. NW., 821.....			10,446
18th St. NW., 718.....			² 41,330
19th St. NW., 1220.....			² 44,100
26th St. NW., 501 and 513 ¹			22,200
Total.....		18,303,567	2,819,048

¹ Portion of building only.² Gross area.³ Protection only.

TABLE 8.—Office Buildings Outside the District of Columbia Maintained, Operated, and Protected by the National Park Service

Building	Location	Government-owned gross floor area
Broadway, 45.....	New York City, N. Y.....	142,500
Courthouse.....	Aiken, S. C.....	17,474
Do.....	New York City, N. Y.....	655,787
Do.....	Parkersburg, W. Va.....	34,900
Do.....	Santa Fe, N. Mex.....	47,600
Federal Office.....	Des Moines, Iowa.....	64,200
Do.....	Galveston, Tex.....	15,000
Immigration Station.....	Baltimore, Md.....	98,000
Old Custom House.....	Denver, Colo.....	72,500
Old Post Office.....	Sacramento, Calif.....	47,600
Sub-Treasury.....	New York City, N. Y.....	72,000
Total.....		1,267,561

TABLE 9.—Special Structures Maintained, Operated, and Protected by the National Park Service

Structure	Location
Columbus Fountain.....	Union Station Plaza.
District of Columbia War Memorial.....	West Potomac Park.
House where Lincoln died.....	516 10th St. NW.
Lee Mansion.....	Arlington, Va.
Lincoln Memorial.....	West Potomac Park.
Lincoln Museum.....	511 10th St. NW.
Washington Monument.....	The Mall between 14th and 17th Sts.

TABLE 10.—Statement Showing Work Accomplished at Civilian Conservation Corps Camps Under the Jurisdiction of the National Park Service, July 1, 1937, to June 30, 1938

Item	Unit	Total work accomplished July 1, 1937-June 30, 1938			
		New construction		Maintenance	
		National parks and monuments	State parks	Combined total national parks and State parks	National parks and monuments
Bridges, foot and horse.....	Number	10	49	59	21
Bridges, vehicle.....	Number	12	35	47	102
Barns.....	Number	2	3	5	8
Bathhouses.....	Number	3	29	32	4
Cabins, overnight.....	Number		254	254	
Combination buildings.....	Number		48	48	
Dwellings.....	Number	48	33	81	304
Equipment and supply storage houses.....	Number	39	67	106	38
Garages.....	Number	11	67	78	9
Latrines and toilets.....	Number	89	136	225	135
Lodges and museums.....	Number	4	22	26	21
Lookout houses.....	Number				5
Lookout towers.....	Number	3	3	6	1
Shelters.....	Number	15	83	98	6
Other buildings.....	Number	32	152	184	245
Cribbing, including filling.....	Cubic yards.	700	16,999	17,699	3,580
Impounding and large diversion dams.....	Number	2	33	35	
Fences.....	Rods	11,637.5	61,299	72,936.5	22,916
Guard rails.....	Rods	1,809.5	16,837.3	18,646.8	644
Levees, dykes, jetties, and groins.....	Cubic yards.		322,587	322,587	
Power lines.....	Miles	14.4	52.1	66.5	9.7
Incinerators.....	Number	5	63	68	2
Sewage and waste-disposal systems.....	Number	94	330	424	62
Telephone lines.....	Miles	140.5	119.3	259.8	1,260.8
Fountains, drinking.....	Number	64	138	202	
Pipe or tile lines.....	Linear feet	103,435	351,364	454,799	17,023
Storage facilities (omit last 000).....	Gallons	88.6	613.5	702.1	
Wells, including pumps and pump-houses.....	Number	5	95	100	3
Miscellaneous, water supply systems.....	Number	1	15	16	12
Camp stoves or fireplaces.....	Number	177	2,162	2,339	37
Cattle guards.....	Number	1	20	21	
Corrals.....	Number	4	7	11	3
Seats.....	Number	102	1,836	1,938	108
Signs, markers, and monuments.....	Number	3,621	4,355	7,976	1,763
Stone walls.....	Rods	212.9	1,215.4	1,428.3	1,837
Table and bench combinations.....	Number	627	3,887	4,514	36
Tool boxes.....	Number	7	61	68	
Miscellaneous, other structural improvements.....	Number	440	3,168	3,608	10
Radio stations.....	Number				29
Springs.....	Number	16	12	28	3
Waterholes.....	Number		6	6	
Small reservoirs.....	Number	7	25	32	14
Landing docks and piers.....	Number	1	10	11	1
Truck trails or minor roads.....	Miles	156.2	403.5	559.7	2,786.1
Foot trails.....	Miles	62.1	130.5	192.6	291.3
Horse or stock trails.....	Miles	165	45.4	209.4	1,631.4
Stream and lake bank protection.....	Square yards.	4,500	216,347	220,847	2,060
Bank sloping.....	Square yards.	178,862	429,502	608,364	530,444
Check dams, permanent.....	Number	429	2,226	2,655	
Check dams, temporary.....	Number	3,529	1,165	4,694	214
Seeding and sodding.....	Square yards.	164,622	256,156	450,778	344,800
Tree planting, gully.....	Square yards.	112,740	46,850	159,590	
Ditches, diversion.....	Linear feet	6,360	11,950	18,310	6,800
Terracing.....	Miles	7.3	2	9.3	
Planting, seed, or sod.....	Square yards.		6,400	6,400	
Wind erosion area treated.....	Acres		19	19	
Water spreaders (rock, brush, wire).....	Linear feet		2,309	2,309	
Clearing and cleaning channels and levees.....	Square yards.		66,049	66,049	
Clearing and cleaning reservoir, pond, and lake sites.....	Acres		2,043.7	2,043.7	
Lining of waterways.....	Square yards.	4,560		4,560	
Excavation, canals, channels, ditches, earth.....	Cubic yards.	76,953	1,062,302	1,139,255	
Excavation, canals, channels, ditches, rock.....	Cubic yards.	62	2,375	2,437	
Pipe and tile lines and conduits.....	Linear feet.....	9,072	12,477	21,549	25
Riprap or paving, rock or concrete.....	Square yards.	8,501	35,522	44,023	
Riprap or paving, brush or willows.....	Square yards.	4,200		4,200	

TABLE 10.—Statement Showing Work Accomplished at Civilian Conservation Corps Camps Under the Jurisdiction of the National Park Service, July 1, 1937, to June 30, 1938—Continued

Item	Unit	Total work accomplished July 1, 1937-June 30, 1938			
		New construction		Maintenance	
		National parks and monuments	State parks	Combined total national parks and State parks	National parks and monuments
Water control structures other than dams.	Number	20	185	205	3
Field planting or seeding (trees)	Acres	4,406.8	8,684.4	13,091.2	3,896
Forest stand improvement	Acres	132	1,501.3	1,633.3	
Nurseries	M/days	16,705	42,407	59,112	6,228
Tree seed collection, conifers (cones)	Bushels	191	432	623	
Tree seed collection, hardwoods	Pounds	1,604	9,368	10,972	
Collection of tree seedlings	Number	300	24,775	25,075	
Fighting forest fires	M/days	7,477	19,529	27,006	
Firebreaks	Miles	11.5	95.7	107.2	42.1
Fire hazard reduction, roadside and trailside	Miles	131.9	165.3	297.2	
Fire hazard reduction, other	Acres	6,273.1	13,036	19,309.1	
Fire suppression	M/days	36,474	60,573	97,047	
Fire prevention	M/days	778	1,027	1,805	
Tree and plant disease control	Acres	8,256.5	13,596.6	21,853.1	1,200
Tree insect pest control	Acres	26,230.8	51,402	77,632.8	8,660
Beach improvement	Acres	190.8	81.9	272.7	
General clean-up	Acres		113.5	113.5	
Landscaping, undifferentiated	Acres	6,586.8	10,955.6	17,542.4	5,844.6
Moving and planting trees and shrubs	Number	387,166	1,615,135	2,002,301	704,402
Parking areas and parking overlooks	Square yards	115,821	780,838	896,659	2,840
Public campground development	Acres	43.5	363.6	407.1	1,559
Public picnic ground development	Acres	20.8	356.8	377.6	225.5
Razing undesired structures and obliteration	M/days	71,625	146,138	217,763	
Seed collection (other than tree)	Pounds	1,318	2,853	4,171	
Seeding or sodding	Acres	663.9	1,699.9	2,363.8	3,195.5
Soil preparation (fertilizing, etc.)	Acres	353.2	960.7	1,313.9	
Vista or other selective cutting for effect	Acres	294.5	745.1	1,039.6	
Walks; concrete, gravel, cinder, etc.	Linear feet	13,544	50,329	63,873	6,075
Fish rearing ponds	Number	2	15	17	25
Food and cover plant and seeding	Acres		133.6	133.6	
Lake and pond development	M/days	4,410	20,660	25,070	171
Stocking fish	Number	684,336	79,500	763,836	
Stream development (wildlife)	Miles	2.1	.1	2.2	
Other wildlife activities	M/days	3,471	8,582	12,053	68
Wildlife feeding	M/days		701	701	
Wildlife shelters	Number		164	164	
Education, guide and contact station work	M/days	64,213	76,821	141,034	
Emergency work	M/days	3,454	40,679	44,133	
Eradication of poisonous weeds or exotic plants	Acres	728	1,133	1,911	
Experimental plots	Number	7	200	207	10
Insect pest control	Acres		2,150.5	2,150.5	
Maps and models	M/days	3,249	7,459	10,708	
Marking boundaries	Miles	123.3	62.5	185.8	
Mosquito control	Acres	18	93	111	
Preparation and transportation of materials	M/days	130,003	377,822	507,825	
Archeological reconnaissance and investigation	M/days	26,759	9,087	35,846	
Other reconnaissance and investigation	M/days	2,628	13,542	16,170	
Restoration of historic structures	Number	344	30	374	
Rodent and predatory animal control	Acres		50	50	
Surveys	M/days	17,858	82,775	100,633	
Tree preservation	M/days	16,501	23,174	39,675	
Equipment, repair or construction	M/days	8,666	3,322	11,988	
Hydraulic research	M/days	253	232	535	
Warehousing	M/days	4,185	5,139	9,324	
Elimination of livestock and predators	Number	5,141		5,141	
Unclassifiable	M/days	434	682	1,116	



UPPER: ONIONS BY THE TON HARVESTED LAST YEAR ON THE OWYHEE
RECLAMATION PROJECT IN EASTERN OREGON.
LOWER: LETTUCE GROWN ON THE SALT RIVER RECLAMATION PROJECT
IN ARIZONA

BUREAU OF RECLAMATION

John C. Page, *Commissioner*

HOME-MAKING opportunities created by the Bureau of Reclamation through its construction were eagerly sought during the 1938 fiscal year as migration westward into the arid and semiarid region continued from other areas, particularly the Great Plains.

Comparatively few farmsteads were made available, but those which were ready attracted great attention. The construction program went forward rapidly with promise of new lands in larger amounts within 2 years. Meanwhile, large numbers of migrants in the West, seeking homes but forced to subsist on temporary employment here and there in harvests, are presenting an increasingly serious problem.

Projects now being constructed by the Bureau eventually will add approximately 2,500,000 acres to the cultivated area of the arid and semiarid States, but this work constitutes a long-term program. When completed, these new projects will make available more than 31,000 farmsteads, but, in the aggregate, this number, even if immediately available, would not be sufficient to take care of more than a part of the homeless farm families now in the West.

Gratifying results were obtained on the new land which has been settled in the last few years, in part by drought refugees.

Significant were the following developments:

For 69 farm units made available to homestead entry on the Tule Lake division of the Klamath project on September 9, 1937, more than 3,300 persons applied informally and a total of 1,280 formal applications were filed for consideration.

On the new Owyhee project almost 75,225 acres were irrigated principally in the Mitchell Butte and Dead Ox Flat divisions. Much of this is land recently placed in cultivation. Settlement and land development are keeping pace with the availability of water on the new lands. The demand to purchase private land and to file on homesteads continues very high. The 1937 crop value per acre of the lands in cultivation was \$31.25.

Settlement and development of the Riverton project continued to show good progress. Crops produced in 1937 were the best so far. At the beginning of 1938 there was an increase of 5 percent in the number of settlers and in the area in cultivation. At the close of

the fiscal year the promise was for a better than average yield. Demand for new land on the project was insistent by well-qualified home seekers. The morale of the settlers continues excellent.

Virtually all available lands have been taken since 1934 on the Vale project, where now 410 settlers are established. Diversified crops are produced on most farms, but sugar beets are rising in importance on the project. The crop results in 1937 were very good.

On two Montana projects and on two in Colorado the Farm Security Administration established settlements of drought-stricken farmers on tracts purchased from nonresident owners, loan companies, estates, and from old people. On the Sun River project 12,549 acres thus were divided into farms varying in size from 80 to 160 acres upon which complete sets of buildings were erected. One farm family was moved to each of these units. On the Milk River project about 100 new settlers were located in a similar manner. Although these drought refugees had not had previous experience in irrigation agriculture, as a rule they readily adapted themselves to the conditions on the project. Similar settlement projects were established on the Grand Valley and Uncompahgre projects in Colorado. Results obtained to date have been very satisfactory.

On several of the old operating projects there was an influx of farmers from drought-stricken areas. Where the opportunities existed, many rented farms. Some purchased land. Others sought work. Most of these refugees were in serious financial straits. Some, even though they were able to obtain possession of farms, did not have funds sufficient to obtain equipment necessary to operate them. It is a subject for deep regret that many of these farmers located themselves on lands which were not especially good. For the most part, only the poorer lands of the project were available for such unplanned resettlement.

The remedial projects which were placed in operation during the year also made good progress. In Utah on the Ogden River project, which serves an area which has been under cultivation for many years, provision of a late season water supply by completion of Pine View Dam resulted in the planting of a number of new orchards and a general improvement in the agriculture of the project land during the year. Development also proceeded on the Humboldt project in Nevada where several new crops were tried during the 1938 season. A California sugar-beet concern planted 500 acres of sugar beets on the project as a demonstration.

Although low farm prices reduced the average per acre crop revenue on Federal reclamation projects during the year, the 1937 season was generally satisfactory. On a few projects it was better than the 1936 season. On the Yuma project in Arizona the total crop value was \$3,025,035, the highest total since 1929. An increase of approxi-

mately 800 acres was recorded in the amount of land irrigated during the season and crop values increased about \$50,000. Bank deposits were up \$84,000. On the Salt River project also in Arizona, crop returns increased $3\frac{1}{2}$ percent and bank deposits 6 percent over the previous year.

CONSTRUCTION PROGRAM

The construction program of the Bureau of Reclamation during the fiscal year was the largest in its history. Work was in progress on 32 projects in 12 States.

Two major dams were begun, bringing to 13 the number of storage dams and to 3 the number of diversion dams now under construction. Twenty-two additional dams have been authorized. The following dams were completed during the year: Taylor Park Dam on the Uncompahgre project in Colorado, Unity Dam on the Burnt River project in Oregon, Alamogordo Dam on the Carlsbad project in New Mexico, Anita Dam on the Huntley project in Montana, and the small Box Canyon Dam on the Rio Grande project. Diversion dams completed included the Cross Cut Dam on the Upper Snake River project in Idaho.

Work done during the year brought to a grand total of 147 the number of storage and diversion dams which have been completed by the Bureau of Reclamation since its origin in 1902. Of these, Shoshone, Arrowrock, Owyhee, and Boulder Dam, each was at the time of its completion the highest in the world. Boulder Dam, with a maximum height of 726.4 feet above the lowest point of foundation, still holds this record.

The Bureau's construction program was continued at an accelerated rate by allotments of emergency funds in addition to regular appropriations. Funds on hand from appropriations and new Public Works Administration allotments are sufficient to continue the program at an adequate and economical rate during the fiscal year 1939.

During 1938 construction was started on two new dams, the Vallecito Dam on the Pine River project in Colorado and the Deer Creek Dam on the Provo River project in Utah. The Vallecito Dam, with an embankment containing 3,200,000 cubic yards of earth and 475,000 cubic yards of cobble, rock, gravel, and riprap, will be the largest of its type constructed by the Bureau. The Deer Creek Dam will rank second, with approximately 3,000,000 cubic yards of earth and rock facing.

Within the 1938 fiscal year the Bureau constructed 326.2 miles of canals, 164.6 miles of drains, 9 tunnels with a total length of 18,545 feet, 214.7 miles of road, $\frac{1}{2}$ mile of railroad, 365.3 miles of transmission lines, 104.7 miles of pipe, 4,250 canal structures, 282 bridges, 911 culverts, and 200 flumes. There were placed in dams 2,367,662 cubic

yards of concrete, 2,878,571 cubic yards of earth, and 607,415 cubic yards of rock fill; and 34,049.096 cubic yards of earth and rock were excavated. The Bureau used 4,006,594 barrels of cement.

GRAND COULEE DAM

The base of Grand Coulee Dam, 250 feet high and containing 4,541,909 cubic yards of concrete, was completed on March 21, 1938, a full year ahead of schedule.

Uninterrupted continuation of the construction of this, the most massive masonry structure ever undertaken by man, was assured by the award in February of a contract to complete the dam to its full height of 550 feet. The new contractor, Consolidated Builders, Inc., took over, on March 21, the work then in progress. The new contract was well under way by the end of the fiscal year. It includes the placing of 5,809,500 cubic yards of concrete.

The contract for the construction of the base of Grand Coulee Dam was awarded on July 16, 1934, and notice to proceed was given on September 28 of that year. About 4½ years were allowed for its completion. The contractor, with the aid, at one time, of nearly 7,000 men, moved from the dam site 17,177,042 cubic yards of overburden and of placed concrete in excess of the quantities needed to complete Boulder Dam. The earnings under this contract were \$38,172,560.

Under the new contract 4 years are allowed for completion of the dam and of the powerhouse on the western bank of the river.

While the base of Grand Coulee Dam was being completed and a start was being made on the job of raising it to its full height, excellent progress was being made during the fiscal year on engineering surveys and land classification work on the 1,200,000 acres of land to be irrigated by the project. Retracement surveys were completed on 891,212 acres and topography charts were completed on 502,538 acres. An average of 135 engineers was employed at this work throughout the year. All field work on land classification of 228,395 acres had been completed by the end of the year.

CENTRAL VALLEY PROJECT

A beginning was made on large-scale construction on the great Central Valley project. By the close of the year work was about to commence on Shasta Dam, one of three outstanding dams in the world to be built by the Bureau of Reclamation.

This project is designed to alleviate critical water shortage and problems in three important agricultural areas of the State through the conservation of waste flood waters of California's major rivers. In size and importance the Central Valley project is without precedent among the remedial projects undertaken by the Bureau of Reclamation.

Since completion of the project requires adjustment in water flow and distribution and the acquisition of rights-of-way in large and highly improved irrigated areas, many complex legal problems have been encountered. Much progress was made during the fiscal year toward the solution of these problems, and at the close of the year final settlement on several seemed imminent.

Through regulation of both the Sacramento and the San Joaquin Rivers the Central Valley project will provide adequate water to supplement the irrigation supply of a large area of highly improved orchard and farm lands in the southern San Joaquin Valley; reestablish navigation to Red Bluff on the Sacramento River; prevent salt water intrusion in the irrigation channels of the delta of the Sacramento-San Joaquin Rivers; provide supplemental water for irrigation, domestic and industrial uses in the Walnut Creek-Martinez area, south of Suisun Bay; and make possible the generation of 350,000 kilowatts of water power at Shasta Dam.

Camps to house employees of the Government during the construction of Friant and Shasta Dams were completed and by the end of the fiscal year work on the first 4-mile section of the Contra Costa Canal was nearing completion. Work was in progress on a 1,600-foot tunnel at Shasta Dam site which is to be used temporarily to divert the Southern Pacific Railroad past the dam site and later to divert the flow of the Sacramento River as Shasta Dam is being built.

Near the end of the fiscal year several important contracts were awarded on other units of the Contra Costa Canal and bids were called for the construction of Shasta Dam.

Shasta Dam, on the Sacramento River about 14 miles north of Redding, will be 560 feet in height, the second highest in the world. It will be 3,500 feet in length along the crest and will contain a volume of 5,610,000 cubic yards of concrete, the second most massive concrete dam in the world. The reservoir to be created by Shasta Dam in the Sacramento, Pit, and McCloud Rivers will have a capacity of 4,500,000 acre-feet of water.

On June 1, two bids were received by the Bureau at its Sacramento office on invitations to contractors to submit proposals for the construction of this giant structure. The lower bid was that of the Pacific Constructors, Inc., of Los Angeles, Calif., a firm made up of 12 large contractors.

This bid, in the amount of \$35,939,450, was being considered at the end of the fiscal year. Bids also were called in June for the construction of the Sacramento River bridge, first crossing, for the relocated Southern Pacific Railroad. The railroad must be moved from the Shasta Reservoir area and relocated on higher ground. The Denver office was engaged in the preparation of plans and specifications for 30

miles of railroad relocation and 7 bridges between Redding and Delta, Calif.

BOULDER CANYON PROJECT

Construction at Boulder Dam during the year consisted of the erection of machinery and installation of electrical fixtures with an average of about 500 men employed. Main generating units N-5 and N-6 were being installed, with N-5 ready for final tests at the end of the year. Lake Mead, on June 30, contained 22,500,000 acre-feet of water and was 114 miles long.

Rapid progress was made on the All-American Canal system. All sections of the main canal and all important structures were either completed or under construction at the end of the year. Excavation of 43 miles of the 130-mile Coachella branch canal was advertised and bids were opened at Yuma, Ariz., on June 3. The low bid indicated a cost of \$0.0424 per cubic yard for 9,030,000 cubic yards of earth excavation.

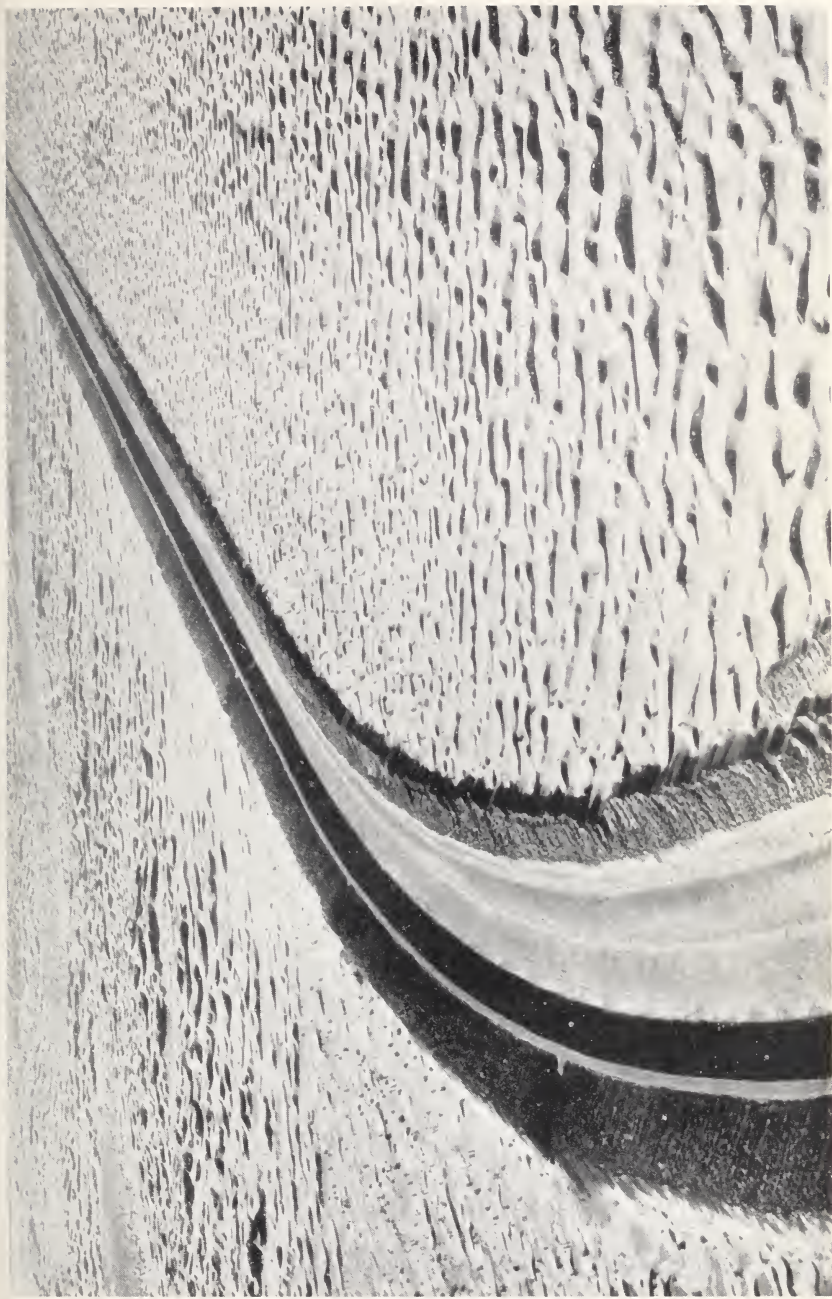
Imperial Dam and desilting works at the head of the All-American Canal on the Colorado River were virtually completed, the last concrete being placed June 6.

The All-American Canal is by far the largest irrigation ditch in the United States. It is 80 miles long and has an initial capacity of 15,000 cubic feet of water per second. The maximum section has a width of 232 feet at the water surface and a bottom width of 162 feet, with a water depth of 21 feet. Power will be developed on the canal by the Imperial Irrigation District at four points. Earth excavation amounted to approximately 65,000,000 cubic yards. The Coachella branch will have a capacity of 2,300 second-feet. Imperial Dam, of the slab and buttress type, has a crest length of 3,475 feet and is 45 feet in height. The desilting works consist of 3 double basins, each 500 by 800 feet and each containing 24 motor-driven, rotating scrapers which will assist in removing the silt. At the Arizona end of Imperial Dam are located the headworks for Gila Valley Canal of the new Gila project.

COLORADO-BIG THOMPSON PROJECT

On December 21, 1937, the President approved a finding by the Secretary that the Colorado-Big Thompson project was feasible. Previously, Congress had appropriated \$900,000 to commence construction of this project.

The project is designed to supply supplemental water for 615,000 acres of land on the eastern slope of the Continental Divide in north-eastern Colorado. More than 300,000 acre-feet of water annually will be carried from the headwaters of the Colorado River on the western slope through a tunnel 13.1 miles long to the South Platte



CALIFORNIA'S NEW RIVER, THE ALL-AMERICAN CANAL NEARING COMPLETION BY THE BUREAU OF RECLAMATION.



drainage area. Virtually all the lands to be served by the project are at present farmed by irrigation.

The tunnel, known as the Continental Divide Tunnel, is the major engineering feature of the project. It will be horseshoe shaped, 9½ feet in diameter, and will cost an estimated \$7,271,000. Other construction will include storage reservoirs, diversion dams, canals, tunnels, six power plants with an installed capacity of 142,500 kilowatts, pumping plants, and 146 miles of transmission lines. The first work to be undertaken will be the construction of Green Mountain Dam, a 270-foot earth-fill structure about 10 miles above the mouth of Blue River.

Green Mountain Reservoir will have a capacity of 152,000 acre-feet and will provide replacement storage for western-slope water users. The total cost of the project is estimated at \$44,000,000.

At the close of the fiscal year negotiation of a contract was being completed between the United States and the Northern Colorado Water Conservancy District by which the district would undertake repayment of the project costs chargeable to irrigation. At the same time the Denver office of the Bureau of Reclamation was drafting plans for the commencement of construction of Green Mountain Dam and power plant, the Continental Divide Tunnel, and construction camps at Estes Park and at other points in the project area.

OTHER CONSTRUCTION

Other important dams under construction during the fiscal year were the following: Marshall Ford Dam, 190-foot, concrete, straight gravity type, on the Colorado River of Texas project; Bartlett Dam, 270-foot, concrete multiple-arch type, on the Salt River project, Arizona; Parker Dam, 340-foot, concrete-arch type, on the Colorado River, near Parker, Ariz.; Imperial Dam, 45-foot, slab and buttress type, a part of the All-American Canal system, Boulder Canyon project, California; Vallecito Dam, 150-foot, earth-fill type, on the Pine River project, Colorado; Island Park Dam, 85-foot, earth-fill type, and Grassy Lake Dam, 120-foot earth-fill type, on the Upper Snake River storage project, Idaho; Boca Dam, 110-foot, earth-fill type, on the Truckee River storage project, Nevada-California; Moon Lake Dam, 110-foot, earth-fill type, on the Moon Lake project, Utah; Seminole Dam, 260-foot, concrete arch, on the Kendrick project, Wyoming; and Bull Lake Dam, 75-foot, earth-fill type, on the Riverton project, Wyoming.

In April a contract was awarded to the Rohl-Connolly Co., of Los Angeles, Calif., to build the 150-foot Deer Creek Dam on the Provo River project in Utah at its bid of \$2,189,096.50.

Construction was in progress during the year on the Casper Canal, Kendrick project, with Government forces; and by contract on canals

of the Heart Mountain division of the Shoshone project, Wyoming; the Payette division of the Boise project, Idaho; and the Roza division of the Yakima project, Washington.

CUMULATIVE CONSTRUCTION RESULTS

In the 36 years the following construction has been completed by the Bureau of Reclamation: 147 storage and diversion dams; 47 powerhouses; 2,512 buildings; 19,606.4 miles of canals, ditches, and drains; 75.8 miles of tunnels; 4,500.3 miles of telephone lines; 281.6 miles of dikes; 6,241 flumes; 19,605 culverts; 13,448 bridges; 187,214 other irrigation structures.

Reservoirs of the Bureau of Reclamation now have a combined capacity of 45,522,970 acre-feet of water.

POWER

Twenty-four power plants were operated on 13 Federal reclamation projects during the 1938 fiscal year. Their total output was 2,457,-644,625 kilowatt-hours of energy.

The fifth of the great generators at Boulder Dam began operating near the close of the year; the sixth was being installed; and two more were being manufactured. With one smaller unit, two station service units, and the five big generators in operation, a total of 1,452,285,000 kilowatt-hours of electric energy were produced at Boulder Dam. Of this amount, 1,427,928,442 kilowatt-hours were sold for a gross revenue of \$1,888,132.84.

Gross sales of energy from all project plants totaled \$6,377,961.33. Some of the plants are operated and controlled by water users' organizations.

Projects under construction which contemplate power developments include the Grand Coulee Dam-Columbia Basin project in Washington, the Central Valley project in California, and the Kendrick project in Wyoming. Projects with power features which are authorized, but upon which construction had not been begun at the close of the year, include the Colorado-Big Thompson project in Colorado and the Elephant Butte power plant in New Mexico.

Generators and other electrical equipment for the Seminole plant and transmission lines of the Kendrick project were being manufactured, and power sales contracts were being negotiated.

RECLAMATION FUND

The serious situation with respect to the reclamation fund, noted in previous reports, was to a great degree alleviated for the immediate future during the fiscal year by enactment of legislation providing new revenues for the fund.

The Hayden-O'Mahoney amendment to the departmental appropriation bill provided seriously needed, immediate support for the fund, as well as a new source of accretion for the future which will, in large measure, replace in the scheme of financing the reclamation program the all but vanished accretions from the sale of public land.

This legislation provided that 52½ percent of the moneys collected up to June 30, 1938, on royalties from the naval petroleum reserves should be deposited in the reclamation fund. Of the total sum involved, however, \$15,000,000 was to be retained in the General Treasury to cancel a loan in that amount previously made to the reclamation fund. This provision relieved the special fund of a drain of \$2,000,000 per annum during the next few years. Although no accounting had been made at the end of the fiscal year, it was anticipated that, in addition to retiring the loan, approximately \$15,000,000 would be received into the reclamation fund.

Accretions to Reclamation Fund, by States

State	Sale of public lands		Proceeds from Oil Leasing Act		Total to June 30, 1938
	Fiscal year 1938	To June 30, 1938	Fiscal year 1938	To June 30, 1938	
Alabama.....			\$3,426.09	\$185,410.55	\$185,410.55
Arizona.....	\$18,828.66	\$2,705,327.41		160.20	2,705,487.61
California.....	19,413.69	8,205,050.33	1,733,882.78	15,822,947.68	24,027,997.41
Colorado.....	10,079.30	10,283,302.96	71,196.79	707,202.22	10,990,505.18
Idaho.....	8,155.26	7,018,923.38	1,388.29	20,776.52	7,039,699.90
Kansas.....	109.13	1,033,176.73	21.00	21.00	1,033,197.73
Louisiana.....			122,792.63	196,054.29	196,054.29
Mississippi.....			11.55	11.55	11.55
Montana.....	16,258.75	15,359,087.09	59,633.39	1,255,754.99	16,614,842.08
Nebraska.....	122.56	2,994,431.14			2,994,431.14
Nevada.....	3,166.58	1,026,246.68	84.00	5,531.37	1,031,778.05
New Mexico.....	20,890.82	6,682,433.77	370,360.71	1,354,592.13	8,037,025.90
North Dakota.....	552.89	12,219,211.66	16,497.76	169,219.54	12,388,431.20
Oklahoma.....	141.52	5,929,544.58			5,929,544.58
Oregon.....	8,502.90	11,980,833.16	176.54	186.82	11,981,019.98
South Dakota.....	1,796.12	7,733,413.02	294.70	2,143.96	7,735,556.98
Utah.....	9,976.23	4,249,278.82	83,418.97	617,145.33	4,866,424.15
Washington.....	3,806.89	7,450,872.68		33,749.63	7,484,622.31
Wyoming.....	20,875.14	8,665,490.94	890,681.62	35,264,961.81	43,930,452.75
Total.....	142,676.44	112,636,624.35	3,353,866.82	55,635,868.99	168,272,493.34
Proceeds, Federal water power licenses.....					¹ 780,266.97
Proceeds, potassium royalties and rentals.....					² 410,955.26
Grand total.....					169,463,715.57

¹ Proceeds for fiscal year, \$20,533.60.

² Proceeds for fiscal year, \$82,601.47.

A second provision of the amendment, one of far greater importance to the future of the reclamation program, directed that repayments made by water and power users on projects financed from emergency fund allotments and general fund appropriations should be deposited in the reclamation fund until such time as the cost of the project has been returned; the net power receipts then should go to the General Treasury.

Eventually, as repayments are completed over long periods on the several projects, most of them at present still under construction, upon

which allotments and general funds have been and are being expended, it may be expected that \$350,000,000, or more, will have accrued to the reclamation revolving fund. Accruals from this source are not expected to be large in the near future, since the projects from which they will be received have been only recently completed and have not begun repayment, or they are not as yet completed. Within a decade, however, several millions of dollars a year should be added to the reclamation fund as a result of this legislation.

REPAYMENTS

The Repayment Commission created by the Act of August 21, 1937, recommended and the Secretary approved postponement of repayments due during the fiscal year to a total of \$300,331. Relief was granted in this manner to 10 different projects or units of projects. The Repayment Commission recommended this relief after investigating the condition of all Federal reclamation projects now in operation. Generally, upon the recommendation of the Commission, these payments were postponed until the conclusion of the repayment contracts with the water users. Postponed payments represented roughly 10 percent of the moneys due from water users during the year.

Construction payments during the year totaled \$2,299,689; operation and maintenance collections amounted to \$1,256,689.27; while water rental payments totaled \$363,961.53. Arrearages at the close of the fiscal year were as follows: Construction \$1,169,488.16; operation and maintenance \$179,224.51; and water rental \$85,176.62.

Delinquencies were exceptionally high on a few projects. In some instances, this was true apparently because directors of irrigation districts, anticipating relief which was not received as a result of the Repayment Commission's investigations, neglected to levy charges upon the water users sufficient to yield the funds necessary to meet their full contract obligations. On many projects the water users paid substantially all due from them. The arrearages include a few comparatively large accounts which apparently never can be collected, and these should be adjusted by corrective legislation.

Half the construction repayments due the previous year had been postponed by a special act of the Congress, and previously, for several years, full moratoria had been granted. It is to be hoped that, as a result of the studies and recommendations of the Repayment Commission, legislation can be enacted to provide a more flexible and equitable method of levying the construction repayments. Contracts requiring flat-rate installments annually, making no allowances for fluctuating farm income, must be lenient or cruelly demanding, according to changing economic conditions from year to year.

Status of Reclamation Fund

Accretions to the fund:

Sales of public lands	\$112, 636, 624. 35
Royalties and rental under Mineral Leasing Act	55, 635, 868. 99
Potassium royalties and rentals	410, 955. 26
Federal water-power licenses	780, 266. 97

Total accretions	\$169, 463, 715. 57
Loan from General Treasury	15, 000, 000. 00
Collections—construction and operation and maintenance re-payments, water rents, power and light, etc	119, 569, 552. 35
Total cash available	304, 033, 267. 92
Disbursements	291, 080, 942. 23
Balance in fund June 30, 1938	12, 952, 325. 69

Accounts Receivable, Construction Water-right Charges

State and project	Due		Collected			Uncollected June 30, 1938
	Fiscal year 1938	To June 30, 1938	Cash		Other credits to June 30, 1938	
			Fiscal year 1938	To June 30, 1938		
Arizona:						
Salt River	\$217, 796. 90	\$7, 181, 521. 91	\$217, 796. 90	\$7, 181, 521. 91		
Yuma Auxiliary	15, 727. 82	578, 912. 37	14, 648. 21	577, 668. 66	\$732. 73	\$510. 98
Arizona-California: Yuma	282, 319. 32	4, 269, 644. 91	197, 883. 83	3, 562, 591. 42	652, 406. 39	54, 647. 10
California: Orland	491. 68	827, 017. 87	12, 817. 86	800, 743. 57		26, 274. 30
Colorado:						
Grand Valley	55, 480. 27	253, 263. 21	25, 169. 62	115, 899. 56	137, 363. 65	
Uncompaggre	53, 262. 58	597, 084. 64	28, 501. 81	463, 909. 24	64, 558. 10	68, 617. 30
Idaho:						
Boise	304, 667. 97	4, 342, 457. 07	291, 543. 90	4, 299, 961. 46	27, 193. 29	15, 302. 32
Minidoka	295, 669. 12	8, 546, 349. 27	224, 646. 39	7, 529, 560. 50	921, 485. 95	95, 302. 82
Montana:						
Bitter Root	36, 122. 26	72, 244. 52	18, 025. 42	36, 050. 84		36, 193. 68
Huntley	17, 344. 07	589, 090. 93	14, 435. 36	492, 375. 50	95, 924. 67	790. 76
Milk River	30, 153. 15	127, 910. 88	14, 045. 61	26, 912. 86		100, 998. 02
Sun River	32, 429. 56	312, 020. 90	32, 467. 71	268, 439. 02	40, 278. 49	3, 313. 39
Montana-North Dakota:						
Lower Yellowstone	73, 229. 29	392, 750. 60	46, 402. 15	363, 562. 66	1, 546. 39	27, 641. 55
Nebraska-Wyoming:						
North Platte	261, 235. 45	4, 532, 129. 60	121, 977. 74	2, 934, 169. 80	1, 518, 524. 56	79, 435. 24
Nevada: Newlands	51, 022. 55	1, 286, 113. 13	49, 581. 69	1, 202, 575. 74	79, 525. 90	4, 011. 49
New Mexico: Carlsbad	15, 699. 27	903, 117. 37	4, 308. 57	891, 645. 42	81. 25	11, 390. 70
New Mexico-Texas: Rio Grande	290, 652. 72	3, 498, 602. 17	201, 545. 10	3, 079, 564. 93	419, 037. 24	
Oregon:						
Baker	5, 769. 50	8, 654. 25	5, 769. 50	8, 654. 25		
Umatilla	88, 345. 20	634, 387. 74	3, 960. 06	408, 650. 91	5, 573. 09	220, 163. 74
Oregon-California: Klamath	70, 216. 83	1, 265, 965. 72	61, 919. 98	1, 223, 831. 19	6, 367. 47	35, 767. 06
South Dakota: Belle Fourche	14, 029. 58	698, 121. 11	19, 701. 27	570, 519. 79	81, 908. 17	45, 693. 15
Utah:						
Salt Lake Basin	143, 498. 73	216, 470. 59	143, 498. 73	216, 470. 59		
Strawberry Valley	86, 463. 50	1, 472, 401. 85	85, 663. 50	1, 460, 013. 63	12, 388. 22	
Washington:						
Okanogan	5, 425. 94	148, 327. 74	425. 94	138, 327. 74		10, 000. 00
Yakima	458, 932. 71	7, 391, 907. 11	209, 170. 54	6, 972, 085. 20	86, 668. 41	333, 153. 50
Wyoming: Shoshone	46, 746. 67	1, 053, 581. 70	45, 705. 58	888, 625. 14	164, 675. 50	281. 06
Total	2, 931, 277. 00	51, 200, 039. 16	2, 072, 316. 55	45, 714, 331. 53	24, 316, 239. 47	1, 169, 488. 16
Paid in advance of due dates			¹ 213, 064. 61	397, 600. 83	² 236, 748. 60	
Refunds			1, 298. 50	100, 225. 10	3, 212. 84	
Total collections			1, 860, 550. 44	46, 212, 157. 46		
Contributed funds applying to construction cost not included in above table			50, 272. 70	1, 866, 795. 10		

¹ Contra.² Other credits for fiscal year, \$396,242.³ Increase for fiscal year, \$48,162.67.

Accounts Receivable, Operation and Maintenance Charges (After Public Notice)

State and project	Due		Collected			Uncollected June 30, 1938
	Fiscal year 1938	To June 30, 1938	Cash		Other credits to June 30, 1938	
			Fiscal year 1938	To June 30, 1938		
Arizona: Yuma Auxiliary-----	\$18,329.56	\$517,590.24	\$16,845.09	\$501,156.14	\$12,952.34	\$3,481.76
Arizona-California: Yuma-----	154,843.50	4,154,666.23	147,908.66	3,960,920.66	188,757.67	4,987.90
California: Orland-----	30,059.66	710,989.01	38,247.45	669,034.15	25,757.82	16,197.04
Colorado:						
Grand Valley-----	49,947.60	507,031.57	49,947.60	474,031.57	33,000.00	-----
Uncompahgre-----	-----	1,008,683.69	-----	977,809.79	30,873.90	-----
Idaho:						
Boise-----	8,702.78	2,210,352.80	8,702.78	2,157,703.08	52,649.72	-----
King Hill-----	-----	60,711.27	-----	59,192.22	1,519.05	-----
Minidoka-----	69,732.25	2,273,620.94	63,895.25	2,126,474.88	141,590.86	5,555.20
Montana:						
Frenchtown-----	12,000.00	-----	-----	-----	-----	-----
Huntley-----	-----	554,787.34	-----	543,594.31	11,193.03	-----
Milk River-----	53,546.83	472,464.80	52,570.49	446,169.45	1,662.25	24,633.10
Sun River-----	-----	168,718.50	-----	164,366.28	4,352.22	-----
Montana-North Dakota:						
Lower Yellowstone-----	-----	338,562.56	-----	338,557.93	4.63	-----
Nebraska-Wyoming: North						
Platte-----	23,149.11	1,975,780.18	21,666.38	1,901,350.60	65,336.20	9,093.38
Nevada: Newlands-----	-----	1,174,581.57	-----	1,135,901.55	38,680.02	-----
New Mexico: Carlsbad-----	30,853.83	1,029,055.68	30,853.83	1,012,182.97	16,872.71	-----
New Mexico-Texas: Rio						
Grande-----	305,844.66	4,947,401.19	347,680.01	4,686,230.38	261,170.81	-----
North Dakota:						
Buford-Trenton-----	-----	2,317.41	-----	2,317.41	-----	-----
Williston-----	-----	34,042.75	-----	34,042.75	-----	-----
Oregon:						
Umatilla-----	3,269.80	395,348.20	3,961.93	388,094.24	7,253.96	-----
Vale-----	22,206.89	60,356.56	22,206.89	60,356.56	-----	-----
Oregon-California: Klamath.	63,630.79	1,437,141.29	63,532.84	1,402,406.46	30,536.22	4,198.61
Oregon-Idaho: Owyhee-----	20,051.79	50,869.88	20,051.79	50,869.88	-----	-----
South Dakota: Belle						
Fourche-----	71,255.05	1,323,916.85	71,255.05	1,314,540.86	9,375.99	-----
Utah: Strawberry Valley-----	-----	376,880.88	-----	365,022.21	11,858.67	-----
Washington:						
Okanogan-----	-----	371,441.72	-----	368,788.67	2,653.05	-----
Yakima-----	228,110.38	6,058,325.35	218,971.01	5,876,965.37	71,828.09	109,531.89
Wyoming: Shoshone-----	3,123.03	561,250.87	2,790.12	535,999.81	23,705.43	1,545.63
Total-----	1,154,657.51	32,776,889.33	1,181,087.17	31,554,080.18	² 1,043,584.64	179,224.51
Paid in advance of due dates.	-----	-----	42,730.55	193,478.57	³ 10,982.82	-----
Penalties and interest-----	-----	-----	8,291.09	536,064.71	20,480.00	-----
Refunds-----	-----	-----	12.60	38,241.47	156.00	-----
Total collections-----	-----	-----	1,232,121.41	32,321,864.93	-----	-----

¹ Contra.² Other credits for fiscal year, \$24,024.27.³ Increase for fiscal year, \$10,659.41.

Accounts Receivable, Rentals of Irrigation Water

State and project	Due		Collected			Uncollected June 30, 1938
	Fiscal year 1938	To June 30, 1938	Cash		Other credits to June 30, 1938	
			Fiscal year 1938	To June 30, 1938		
Arizona:						
Salt River.....		\$2,246,726.01		\$2,246,726.01		
Yuma auxiliary.....	\$1,147.20	14,984.03	\$1,147.20	14,984.03		
Arizona-California: Yuma.....	10,320.78	576,977.03	10,223.29	563,829.84	\$12,654.19	\$193.00
California: Orland.....		121,489.73		121,489.73		
Colorado:						
Grand Valley.....	10,897.60	544,623.46	13,385.86	538,122.79	6,500.67	
Uncompahgre.....	4,926.49	1,234,243.85	1,361.60	1,222,661.96		11,581.89
Idaho:						
Boise.....	8,050.00	822,138.57	8,050.00	817,418.07	4,720.50	
Minidoka.....	58,078.98	855,683.58	58,034.78	852,231.37	3,383.01	69.20
Montana:						
Huntley.....	655.00	13,612.48	655.00	13,612.48		
Milk River.....	475.63	238,962.88	475.63	228,616.10	1,208.14	9,138.64
Sun River.....		132,656.90		130,702.92	1,366.62	587.36
Montana-North Dakota: Lower Yellowstone.....	505.80	137,647.40	599.40	136,952.78		694.62
Nebraska-Wyoming: North Platte.....	1,104.50	349,864.47	1,113.50	349,854.47	10.00	
Nevada: Newlands.....		28,291.16		22,114.31	6,176.85	
New Mexico:						
Carlsbad.....		40,741.28	72.00	40,741.28		
Hondo.....		9,129.70		9,129.70		
New Mexico-Texas: Rio Grande.....	86,459.44	1,606,872.96	87,784.44	1,586,115.40		20,757.56
North Dakota:						
Buford-Trenton.....		31.75		31.75		
Williston.....		2,117.28		2,117.28		
Oregon:						
Umatilla.....	2,586.45	102,729.77	2,586.45	76,452.97		26,276.80
Vale.....	17.10	21,561.55	67.10	21,358.72		202.83
Oregon-California: Klamath.....	55,953.39	507,214.84	55,417.80	502,430.59	25.00	4,759.25
Oregon-Idaho: Owyhee.....	75,166.56	137,686.42	65,937.99	127,914.39		9,772.03
South Dakota: Belle Fourche.....	493.06	11,435.74	493.06	11,417.94	17.80	
Utah: Strawberry Valley.....		17,596.13		17,596.13		
Washington:						
Okanogan.....		110,645.28		108,061.09	2,584.19	
Yakima.....	45,027.17	225,106.49	2,532.85	181,982.27	4,082.69	39,041.53
Wyoming:						
Riverton.....	35,596.90	130,806.53	34,435.75	120,138.26	10,455.31	212.96
Shoshone.....	14,015.26	123,528.21	14,040.32	119,652.34	3,800.97	74.90
Total.....	411,477.31	10,365,105.48	358,430.90	10,184,456.97	156,985.94	123,662.57

¹ Other credits for fiscal year, \$5,517.51.

POPULATION OF THE PROJECTS

The total population of Federal reclamation projects at the close of the year was 873,500 persons. Of this total, 222,681 persons lived on 51,834 farms which were provided water by irrigation systems of the Bureau of Reclamation and 650,826 lived in 254 towns and cities established in these irrigated areas.

These communities created by construction of the projects were served by 863 schools and 1,076 churches. In the project areas was a total of 106 banks with deposits amounting to \$190,820,316.

Settlement and Economic Data, 1938

State	Project	Irrigated farms		Towns		Number of schools	Number of churches	Bank deposits
		Number	Population	Number	Population			
Arizona-----	Salt River-----	9,000	67,600	12	95,400	91	152	\$57,586,000
Arizona-California-----	Yuma-----	1,666	3,375	5	8,700	13	27	1,575,535
California-----	Orland-----	673	1,904	1	1,200	9	9	1,033,881
Colorado-----	Grand Valley-----	521	1,496	6	18,950	17	38	4,469,072
Idaho-----	Uncompahgre-----	1,617	3,922	3	8,350	28	35	3,818,892
	Boise-----	4,020	15,705	16	50,500	58	88	(*)
	Mindoka-----	3,429	11,066	6	7,825	22	52	(1)
Montana-----	Bitter Root-----	325	1,111	6	4,500	18	13	1,638,365
	Frenchtown-----	34	120	3	17,150	15	23	8,764,083
	Huntley-----	631	2,160	5	774	8	6	138,759
	Milk River-----	650	2,427	17	11,532	32	36	4,572,417
	Sun River-----	775	1,841	6	821	10	11	344,791
Montana-North Dakota-----	Lower Yellowstone-----	605	2,760	7	4,055	18	22	1,090,545
Nebraska-----	North Platte-----	2,820	9,276	17	22,352	70	54	7,074,961
Nevada-----	Humboldt-----	56	150	1	1,200	4	4	834,450
	Newlands-----	741	2,985	4	2,200	16	12	820,000
New Mexico-----	Truckee River Storage-----	300	1,650	2	28,000	24	15	16,103,000
New Mexico-Texas-----	Carlsbad-----	461	2,010	4	8,000	9	12	1,701,188
	Rio Grande-----	5,423	26,514	36	133,012	88	128	33,543,879
Oregon-----	Umatilla-----	430	1,421	5	1,585	7	10	365,000
	Vale-----	410	1,600	3	1,600	5	12	369,700
Oregon-California-----	Klamath-----	906	2,767	5	17,590	30	35	(1)
	Owyhee-----	5,607	5,607	5	7,000	26	23	(1)
South Dakota-----	Belle Fourche-----	1,435	2,372	5	3,550	28	17	2,500,000
	Hyrum-----	375	1,500	3	3,500	5	6	(2)
Utah-----	Moon Lake-----	600	2,550	10	4,400	17	15	300,000
	Ogden River-----	1,230	4,900	4	53,960	25	56	12,000,000
Washington-----	Sanpete-----	210	1,160	2	1,950	5	4	980,000
	Strawberry Valley-----	2,200	5,550	12	25,000	27	26	1,163,300
Washington-----	Weber River-----	2,100	10,000	10	48,000	46	50	20,000,000
	Okanogan-----	401	961	3	4,700	9	8	1,067,052
Wyoming-----	Yakima-----	5,543	18,040	23	50,268	78	62	6,360,574
	Riverton-----	308	1,320	2	150	2	4	(2)
	Shoshone-----	979	2,801	5	3,052	3	10	544,762
Total, 1938-----		51,834	222,681	254	650,826	863	1,076	190,820,316

* Data is not available.

1 Branch banks. Information not available.

2 No banks on project or in project towns.

OPERATION AND MAINTENANCE

Since 1902 the Bureau of Reclamation has completed in 16 arid and semiarid States 35 separate irrigation projects. Fourteen of these projects are operated and maintained by the Bureau. The operation of the remainder has been transferred to local, legally organized irrigation districts or water users' associations. These are operated in accordance with rules and regulations approved or prescribed by the Secretary and in conformity with contracts under which the transfers were made. Contracts, involving operation and maintenance and other related matters, are in effect between the United States and about 100 such water users' organizations.

It is essential that the Bureau maintain close contact with activities and problems on all its operating projects. In addition to supervision of the routine operation and maintenance of dams, reservoirs, canals, and other features which remain the property of the United States and which make up the irrigation systems of the numerous projects, there are many other matters which require the attention of the Bureau. Matters which have a direct influence upon the social and economic success of the projects, upon the ability of the water users to meet repayment installments to the United States, or upon reclamation as a national policy fall into this class.

The necessity for attention to and for expansion of the functions of the Operation and Maintenance Division was emphasized in the report of the Repayment Commission, submitted during the fiscal year, under authority of the act of August 21, 1937.

With the organization of the division 3 years ago, the Bureau assumed a more vigorous role in the solution of project problems. During the 1938 fiscal year, the Operation and Maintenance Division instituted educational programs in attacking two of the most troublesome problems—the eradication or control of noxious weeds, and introduction of more efficient methods of use of water and of irrigated soils.

In cooperation with water users' organizations and other local agencies, with State colleges and with county agricultural agents, well-planned illustrated lectures, field-study groups, and demonstration projects were made available to, and were well received by, virtually all water users on Federal reclamation projects in connection with these two matters.

In many localities on Federal projects, especially where lands have been in cultivation for many years, wasteful irrigation methods are still employed. On farms in some project areas lands are not properly prepared, and farm ditches are not properly designed and located for optimum crop results. In some localities overirrigation is a fault. Water in excess of that required by the crops grown is applied to the

point where lands are seeped, eroded, or where harmful salts accumulate.

A vigorous program has been instituted in an effort to introduce more up-to-date, practical, and efficient methods. Strawberry clover has been introduced and is proving valuable as a means of making alkaline and seeped soils useful.

Noxious weeds menace farms on many projects. A vigorous attack upon the weed problem has resulted in the institution on several projects of well thought-out weed eradication programs which are most promising. In several areas weed districts have been organized under State control. In others project control boards have taken an active part in sponsoring and carrying forward weed eradication programs. A great number of farmers, informed of the danger from, and of practical methods for control of, noxious weeds, are cleaning up their places.

One important feature of the work of the Operation and Maintenance Division has been informing the water users of practical equipment, which can be manufactured cheaply by the project farmer at home and from materials at hand, for such work as leveling lands; throwing up the low dikes needed for the border method of irrigation; making the corrugations necessary for handling water on steeper fields; eradicating deep-rooted weeds, and testing water penetration in irrigated soils.

CROP RESULTS

Good crops were general on Federal reclamation projects during the 1937 irrigation season, although lower prices offset increased yield. The irrigable area increased 72,795 acres; the irrigated area increased 76,614 acres; and the crop area increased 132,850 acres. The grand total of crop values amounted to \$118,658,272, bringing to \$2,430,-441,514 the cumulative total since the first project began operating in 1906. Except for the 1936 season, this was the best since 1930.

The average per acre crop value on 1,700,969 acres within project boundaries was \$42.85 and that on 1,333,800 acres served with water under Warren Act contracts was \$34.31. Combined, these represented an average yield of crops valued at \$39.09 for each acre served by the irrigation systems and storage reservoirs of the Bureau. This figure, last year, was \$47.10.

With one exception projects had ample water. The snowfall of the winter and the run-off of the spring made the 1938 season one of plentiful stored water in most localities throughout the arid and semiarid region. Several reservoirs spilled for the first time in many years. At the close of the fiscal year, good crops for the ensuing season were again in prospect.

Irrigation and Crop Results on Government Projects in 1937

State	Projects and divisions	Lands on projects covered by crop census					Other lands served by Government works, usually by a partial water supply through private canals under Warren Act or other water-service contracts				
		Irrigable acreage 1	Irrigated acreage	Area in cultivation 2	Crop value		Irrigable acreage	Irrigated acreage	Area in cultivation 2	Crop value	
					Total	Per acre				Total	Per acre
Arizona	Salt River Yuma	242,656	229,460	229,460	\$20,150,853	\$87.52	93,017	74,775	74,775	\$4,225,000	\$55.40
		68,580	53,550	59,706	3,227,279	54.05					
		48,383	43,675	44,948	2,706,339	60.21					
		7,743	3,290	7,635	92,649	12.05					
		6,135	5,176	5,664	226,047	39.91					
California	Valley Division Reservation Division Bard Division Yuma Auxiliary (Mesa)	6,319	1,409	1,409	202,244	143.53					
		19,867	14,650	14,650	580,330	39.61					
		30,513	17,853	17,983	651,836	36.51					
		72,037	62,535	62,271	1,569,432	25.30					
		175,128	150,058	150,273	4,367,817	28.11					
Colorado	Grand Valley Uncompahgre Boise	17,532	14,937	15,152	289,097	19.35					
		40,813	35,155	35,155	920,649	26.19					
		48,602	44,388	44,388	1,227,346	27.65					
		59,469	47,823	47,823	1,645,252	34.47					
		1,818	1,370	1,370	35,208	25.70					
Idaho	New York Irrigation District Nampa Meridian Irrigation District Boise-Kuna Irrigation District Wilder Irrigation District Big Bend Irrigation District Black Canyon Irrigation District (Notus Div.)	6,894	6,385	6,385	247,265	38.73					
		180,129	163,727	163,727	5,226,458	31.92					
		69,871	60,624	60,624	1,971,858	32.58					
		49,286	42,131	42,131	1,540,869	36.57					
		60,972	60,972	60,972	1,710,731	28.05					
Minnesota	Minidoka Minidoka Irrigation District Burley Irrigation District Gooding Division	180,129	163,727	163,727	5,226,458	31.92					
		69,871	60,624	60,624	1,971,858	32.58					
		49,286	42,131	42,131	1,540,869	36.57					
		60,972	60,972	60,972	1,710,731	28.05					
		180,129	163,727	163,727	5,226,458	31.92					

See footnotes at end of table.

Irrigation and Crop Results on Government Projects in 1937—Continued

State	Projects and divisions	Lands on projects covered by crop census					Other lands served by Government works, usually by a partial water supply through private canals under Warren Act or other water-service contracts				
		Irrigable acreage ¹	Irrigated acreage	Area in cultivation ²	Crop value		Irrigable acreage	Irrigated acreage	Area in cultivation ²	Crop value	
					Total.	Per acre				Total	Per acre
Montana	Bitter Root-Huntley-Milk River	16,320	15,720	15,720	297,465	18.92					
		29,501	23,591	16,768	723,869	43.23					
		122,133	60,749	53,327	1,354,188	25.39					
	Malta Division	56,652	25,163	18,372	424,834	23.12					
	Glasgow Division	21,997	7,068	7,429	32,545	12.45					
	Chinook Division	43,484	28,518	27,526	830,809	30.40					
	Sun River	71,883	50,573	54,867	724,951	13.21					
	Fort Shaw Division	13,811	7,806	7,753	122,141	15.75					
	Greenfields Division	58,072	42,767	47,114	602,810	12.79					
Montana-North Dakota	Lower Yellowstone	58,324	44,251	44,251	1,322,430	29.88					
	District No. 1 (Montana)	38,001	30,402	30,402	901,970	29.67					
	District No. 2 (North Dakota)	20,323	13,849	13,849	420,460	30.36					
Nebraska-Wyoming	North Platte	235,309	189,189	171,884	5,843,432	34.00	121,050	106,480	97,535	3,192,221	32.72
	Pathfinder Irrigation District	112,959	82,186	70,040	2,163,890	30.97					
	Gering and Fort Laramie Irrigation District	54,797	51,552	50,309	2,101,078	41.76					
	Goshute Irrigation District	51,383	43,745	41,650	1,376,629	33.05					
	Northport Irrigation District	16,170	11,706	9,885	196,835	19.91					
Nevada	Newlands	66,743	50,772	49,972	945,669	18.95					
New Mexico	Carlsbad	25,055	22,855	22,855	1,209,696	52.03					
New Mexico-Texas	Rio Grande	159,292	143,011	142,499	10,178,953	71.43	78,000	45,100	45,100	1,905,245	42.24
	Elephant Butte Irrigation District	90,192	81,793	78,874	5,420,450	68.72					
	El Paso County Irrigation District No. 1	69,010	63,218	63,625	4,758,563	74.79					
Oregon	Umatilla	15,393	11,335	11,335	225,378	19.89	917	806	806	20,482	25.40
	East Division	7,813	7,038	7,038	146,242	20.78					
	West Division	7,580	4,297	4,297	70,136	18.42					
	Vale	30,000	16,488	16,488	466,097	28.36					

Oregon-California		61,635	51,408	50,439	2,027,919	40,20	63,672	40,309	40,309	1,076,379	26,70
Main Division		41,088	32,319	32,234	1,079,820	34,57					
Tule Lake Division		20,547	19,149	19,205	948,099	49,37					
Owyhee		64,148	26,377	26,377	824,239	31,25	*28,285	*21,272	*21,272	*765,260	*35,97
Advancement Irrigation District		837	576	576	18,279	31,73					
Bench Irrigation District		2,481	2,053	2,053	116,179	56,59					
Crystal Irrigation District		802	807	807	29,327	33,83					
Kingman Colony Irrigation District		1,531	1,230	1,230	48,201	39,19					
Owyhee Irrigation District		52,301	18,161	18,161	448,191	24,68					
Payette-Oregon Slope Irrigation District		6,196	3,490	3,490	164,062	47,01					
Belle Fourche		72,811	33,050	33,050	652,008	19,73					
Weber River (Salt Lake Basin)							86,420	84,790	84,790	3,089,099	36,84
Hyrum		8,226	5,879	5,879	199,616	33,96					
Ogden River							18,262	12,620	12,553	495,392	39,19
Snapec							12,755	5,890	6,280	128,926	20,53
Strawberry Valley		53,889	39,427	39,309	877,245	22,32	7,382	7,069	7,003	175,529	25,07
High Line Division		21,856	17,924	17,806	302,332	16,97					
Spanish Fork Division		22,033	13,374	13,374	332,065	24,82					
Springville-Mapleton Division		10,000	8,129	8,129	242,848	29,87					
Okanogan		5,289	3,461	3,461	132,820	38,37					
Yakima		205,583	162,279	164,343	7,234,818	44,02					
Sunnyside Division		105,860	81,634	83,420	3,175,629	38,07					
Tieton Division		29,537	25,650	25,430	2,470,460	97,15					
Kititas Division		70,186	54,995	55,493	1,588,729	28,63					
Riverton		32,000	23,431	23,431	435,850	18,60					
Shoshone		72,476	57,724	56,644	1,442,996	25,47					
Garland Division		41,627	34,846	34,564	1,014,885	29,36					
Frankie Division		20,041	13,880	13,082	219,544	16,78					
Willwood Division		10,805	8,998	8,998	208,567	23,18					
Grand total, 1937		2,194,830	1,725,463	1,700,969	72,893,649	42,85	1,571,382	1,389,338	1,333,800	45,764,623	34,31
Warren Act lands		1,571,382	1,389,338	1,333,800	45,764,623	34,31					
Grand total of projects proper and Warren Act		3,766,212	3,114,801	3,034,769	118,658,272	39,09					
Grand total, 1936		3,693,417	3,038,187	2,901,919	136,502,480	47,10					
Increase or decrease		+72,795	+76,614	+132,850	-17,844,208	-8 01					

+Increase, -decrease.

1 Area for which the Bureau was prepared to supply water in 1937.

2 See interpretation of subsection F of act of Dec. 5, 1924 (43 Stat. 672), as outlined in circular letter No. 2324, Feb. 15, 1937.

* Includes the Gem Irrigation District and the Ontario-Nyssa Irrigation District.

Irrigated and Cropped Acres and Accumulated Crop Values by Years, 1906-37

Year	Federal irrigation projects				Warren Act lands				Entire area			
	Irrigated acreage	Cropped acreage	Crop value		Irrigated acreage	Cropped acreage	Crop value		Irrigated acreage	Cropped acreage	Crop value	
			For year	Cumulative total			For year	Cumulative total			For year	Cumulative total
1906	22,300	120,100	\$244,900	---	---	---	---	---	22,300	120,100	\$244,900	---
1907	187,628	1,169,000	4,760,460	\$5,005,360	---	---	---	---	187,628	1,169,000	4,760,460	\$5,005,360
1908	289,549	1,260,500	7,635,888	12,641,248	---	---	---	---	289,549	1,260,500	7,635,888	12,641,248
1909	410,628	1,369,500	11,920,663	24,561,911	---	---	---	---	410,628	1,369,500	11,920,663	24,561,911
1910	471,423	413,000	12,944,639	37,506,550	---	---	---	---	471,423	413,000	12,944,639	37,506,550
1911	50,592	470,100	13,086,441	50,592,991	---	---	---	---	50,592	470,100	13,086,441	50,592,991
1912	614,477	540,000	16,007,134	66,600,125	---	---	---	---	614,477	540,000	16,007,134	66,600,125
1913	694,142	637,227	15,676,509	82,276,634	---	---	---	---	694,142	637,227	15,676,509	82,276,634
1914	761,271	703,424	18,475,517	98,752,051	---	---	---	---	761,271	703,424	18,475,517	98,752,051
1915	810,649	700,033	18,104,452	116,916,503	---	---	---	---	810,649	700,033	18,104,452	116,916,503
1916	822,821	858,291	32,815,972	149,732,475	---	---	---	---	822,821	858,291	32,815,972	149,732,475
1917	1,026,663	966,784	56,462,313	206,194,788	---	---	---	---	1,026,663	966,784	56,462,313	206,194,788
1918	1,119,566	1,051,193	66,821,396	273,016,184	---	---	---	---	1,119,566	1,051,193	66,821,396	273,016,184
1919	1,187,255	1,113,469	88,974,137	361,990,321	---	---	---	---	1,187,255	1,113,469	88,974,137	361,990,321
1920	1,228,480	1,153,820	66,171,650	428,161,971	---	---	---	---	1,228,480	1,153,820	66,171,650	428,161,971
1921	1,227,500	1,157,900	49,620,300	477,782,271	---	---	---	---	1,227,500	1,157,900	49,620,300	477,782,271
1922	1,202,130	1,169,100	50,360,850	528,143,121	---	---	---	---	1,202,130	1,169,100	50,360,850	528,143,121
1923	1,213,700	1,179,870	65,488,560	593,189,421	---	---	---	---	1,213,700	1,179,870	65,488,560	593,189,421
1924	1,200,890	1,216,610	66,488,560	659,677,981	---	---	---	---	1,200,890	1,216,610	66,488,560	659,677,981
1925	1,320,300	1,242,750	77,608,880	737,286,861	---	---	---	---	1,320,300	1,242,750	77,608,880	737,286,861
1926	1,411,020	1,328,810	60,369,620	797,656,481	---	---	---	---	1,411,020	1,328,810	60,369,620	797,656,481
1927	1,378,990	1,326,810	70,985,450	868,641,931	---	---	---	---	1,378,990	1,326,810	70,985,450	868,641,931
1928	1,432,080	1,385,560	80,238,800	948,880,731	---	---	---	---	1,432,080	1,385,560	80,238,800	948,880,731
1929	1,489,900	1,420,070	87,559,670	1,036,440,401	---	---	---	---	1,489,900	1,420,070	87,559,670	1,036,440,401
1930	1,504,810	1,467,097	64,418,940	1,100,859,341	---	---	---	---	1,504,810	1,467,097	64,418,940	1,100,859,341
1931	1,562,718	1,462,365	40,121,069	1,140,980,430	---	---	---	---	1,562,718	1,462,365	40,121,069	1,140,980,430
1932	1,555,148	1,506,320	31,165,752	1,172,146,182	---	---	---	---	1,555,148	1,506,320	31,165,752	1,172,146,182
1933	1,589,770	1,529,903	48,138,576	1,220,284,758	---	---	---	---	1,589,770	1,529,903	48,138,576	1,220,284,758
1934	1,552,124	1,464,405	59,628,327	1,279,913,085	---	---	---	---	1,552,124	1,464,405	59,628,327	1,279,913,085
1935	1,640,936	1,604,166	63,601,663	1,343,514,748	---	---	---	---	1,640,936	1,604,166	63,601,663	1,343,514,748
1936	1,702,192	1,629,174	78,902,818	1,422,417,566	---	---	---	---	1,702,192	1,629,174	78,902,818	1,422,417,566
1937	1,725,463	1,700,969	72,893,649	1,495,311,215	---	---	---	---	1,725,463	1,700,969	72,893,649	1,495,311,215

* Estimated.

* Net area in cultivation.

Revised and corrected June 1938. Does not include acreages of lands cropped without irrigation and crop values therefrom.

SECONDARY INVESTIGATIONS

Investigations of 64 proposed projects were in progress during the fiscal year by the Bureau of Reclamation. Funds for this work were available through allotment of emergency moneys and appropriations.

California.—In addition to investigations made in connection with the Central Valley project, two proposed projects were being studied. They were surveys on the Kings River and an investigation of the Tule Lake-Lower Klamath Lake project. Work on the Kings River proposal, which includes an investigation of the feasibility of developing Pine Flat and other reservoirs for irrigation, flood control, and power, was confined principally to analysis of existing data. The study in the Tule Lake-Lower Klamath Lake area was designed to test the feasibility of pumping water from Tule Lake into Lower Klamath Lake, thus providing protection to leased lands around Tule Lake and establishing a bird refuge in Lower Klamath Lake. The report on this project was completed.

Colorado.—Four major investigational programs were in progress in Colorado. They were the western slope surveys; the eastern slope surveys; the Blue River-South Platte diversion proposal, and the Colorado River surveys, which were authorized under the Boulder Canyon Project Act.

In connection with western slope surveys, three reports were completed. The reports covered the Mancos project, which would supplement the water supply of 7,000 to 10,000 acres of land in Montezuma County; the Yampa project, designed to supplement the supply for 15,000 acres, near Yampa, Colo.; and the West Divide project, which would supplement the supply for about 8,000 acres along West Divide Creek.

Field investigations were completed and reports were in preparation on three additional projects; the proposed Paonia project on the North Fork of the Gunnison River; the LaPlatta project, near Durango; and the Florida-Mesa project on Florida River, near Durango.

Field investigations were in progress in connection with proposed projects near Meeker, Colbran, Rifle, Hermitage, De Beque, and Silt, Colo.

Ten proposals were being investigated in connection with the eastern slope surveys. The final report on one of these, the Cherry Creek project, in Arapahoe and Douglas Counties, was completed. This project would provide an irrigation system for 4,300 acres of land along Cherry Creek through the reconstruction of the old Castlewood Dam destroyed in August 1934 by flood, or through the construction of a dam at the Cherry Creek site, 2 miles above Castlewood. In either case the dam would create a reservoir sufficient to control practically all floods on Cherry Creek.

Reports on the following projects are in preparation: Arickaree project in Yuma County; North Republican project at Wray; South Republican project, near Burlington; Badito and Huerfano projects, near Badito and Mustang; Trinidad project, near Trinidad; Hugo and Chivington projects, near Limon and Chivington; and the Apishapa project, near Walsenburg.

The Blue River-South Platte investigation is being made to determine the feasibility of diverting water from the upper tributaries of the Blue River in the Colorado Basin to tributaries of the South Platte River to supplement the irrigation supply of lands in the vicinity of Denver and the municipal supply of that city. Field investigations are virtually completed.

The Colorado River investigations were continued through the year. The land classification surveys necessary to determine irrigable and arable areas have been completed.

Colorado-New Mexico-Texas.—The final report of the Rio Grande joint investigations was completed and transmitted to the National Resources Committee. This investigation was made to determine the best method of supplementing the water supply of various irrigation projects in the Upper Rio Grande Valley.

Hawaii.—A preliminary report on the Molokai proposal was completed. This project would consist of construction of intercepting tunnels, small storage reservoirs, and a canal system to provide water for irrigation of about 12,000 acres on the Island of Molokai.

Idaho.—Boise-Weiser-Payette Basins. Investigations have been in progress and field surveys made of storage sites on the Payette and Weiser Rivers, and in connection with possible transmountain diversion from the Salmon River Basin, and a land classification has been in progress of the Mountain Home area.

Surveys are in progress to determine the best dam site on the South Fork of the Snake River to provide storage of flood flows in order to supplement irrigation supplies and to develop incidental power.

Field work was in progress on the Cabinet Gorge survey for the purpose of determining the physical and economic feasibility of hydroelectric development on the Clark Fork of the Columbia River. The power is to be used for irrigation, pumping, and other purposes.

Idaho-Montana.—Work was continued on the Madison River-Snake River diversion investigation.

Montana.—Three projects were under investigation in Montana. They were the Gallatin Valley proposal, the Marias proposal, and proposal for pumping water to small areas in the vicinity of the Milk River project. Reports were in preparation at the close of the year.

Nebraska.—Reconnaissance reports were completed during the year on the proposed Bostwick and the proposed Mirage Flats projects in Nebraska.

Nevada.—Economic surveys and water supply studies were in progress on the Humboldt River project.

New Mexico.—The final report on the Tucumcari project was completed during the year.

North Dakota.—Reports of the Corps of Engineers on the Heart Butte, the Bowman and the Missouri River diversion projects were reviewed by the Denver office during the year.

A report was completed in November on the Buford-Trenton project, which would involve pumping water from the Missouri River for the irrigation of 13,400 acres, near Buford and Williston.

Oklahoma.—Three projects were investigated. They were the Altus project, by which irrigation water would be supplied to 70,000 acres by diversion from the North Canadian River; the Kenton project; and the Fort Supply project.

Oregon.—Four proposed projects were under investigation. They were the Goose Lake Valley project, near Lake View, upon which a reconnaissance report was completed; the Canby project in the Willamette Valley; the Grande Ronde project, near LaGrande; and the Medford project, by which supplemental water would be provided to the Medford irrigation district and the Rogue River Valley irrigation district.

South Dakota.—Four projects also were under investigation in South Dakota. They were the Shadehill project; the Rapid Valley project and the Angostura project in the Black Hills area; and the Gavins Point project.

Texas.—A reconnaissance report was completed on the Balmorhea proposal, and field surveys were completed in connection with flood-control studies on the Colorado River project.

Utah.—Investigations in Utah covered the Dixie project, upon which a report was submitted, and cooperative studies in the Salt Lake Basin. A special study was made of the proposal for a Salt Lake City aqueduct to derive its water from Deer Creek Reservoir on the Provo River project.

Washington.—Surveys of the land of the Columbia Basin project continued throughout the year. A reconnaissance report was completed on the proposed Glenwood project.

Wyoming.—Field work in connection with the studies of the Green River Basin consisted of reservoir surveys in the Black Fork area and preliminary canal surveys extending from the Kendall Reservoir to the divide between Green River and Sweetwater River Basins and thence to the Red Mesa Desert.

Wyoming-Utah-Idaho.—A cooperative investigation was in progress to determine the feasibility of diverting waters from the Green River to Bear River for the irrigation of lands in the Bear River Basin in the States of Wyoming, Utah, and Idaho. Field work consisted of

preliminary canal surveys and surveys of reservoir sites along tributaries of Blacks Fork Creek in Utah. Water supply studies were in progress.

Colorado River Basin.—Miscellaneous surveys consisting of land classification were in progress in several States within the Colorado River Basin as provided in section 15 of the Boulder Canyon Project Act. The field work in connection with these was virtually completed and reports were in preparation at the end of the year.

CIVILIAN CONSERVATION CORPS

Thirty-four Civilian Conservation Corps camps continued to operate on 25 Federal reclamation projects in 14 Western States during the fiscal year. Enrollees at these camps were engaged chiefly in the reconstruction of irrigation systems, including canals and water control structures; in development of supplemental water supplies; and in the improvement and expansion of recreational facilities at irrigation reservoirs.

The Midview Dam, an earth fill structure 50 feet in height and 670 feet in length, on the Moon Lake project in eastern Utah, was completed, creating a 5,000 acre-foot reservoir to augment the project water supply. Construction of the Anita Dam, a similar structure on the Huntley project in southern Montana, was also completed, providing water storage and regulation facilities for the eastern portion of the project. The C. C. C. boys completed riprapping of the lower embankment of the Deer Flat Reservoir on the Boise project; clearing of Clear Creek Reservoir on the Yakima project; repairing of the Lahontan Dam spillway on the Newlands project; reconstruction of the Malone Diversion Dam on the Klamath project, which partially failed during floods in December 1937; construction of the 1,500 acre-foot S-Canal regulating reservoir on the Newlands project; and additional revetment and jetty work on the Yellowstone River in Montana.

The recreational center at Guernsey Lake, Wyo., was substantially completed by C. C. C. forces at the end of the year. Designed to afford recreation in a desert area, its many facilities are being enjoyed by residents from the surrounding countryside. A similar development had made excellent progress at Elephant Butte Reservoir, N. Mex. There a warm water fish hatchery also has been placed in partial use.

During the year additional emphasis was placed on a new and important branch of the C. C. C. work on reclamation projects. C. C. C. crews expanded the number of their demonstrational projects, situated on Government land in the project areas, designed to acquaint farmers with approved and effective methods of controlling or eradicating noxious weeds.

ORGANIZATION

The Commissioner, appointed by the President and under the supervision of the Secretary, is in administrative charge of the Bureau of Reclamation. He is supported by a staff of 115 officers and employees in Washington. The Chief Engineer at Denver, Colo., assisted by 822 employees, is in general supervision of the engineering and construction activities. Twenty-one construction engineers in charge of projects now under construction, a director of power at Boulder City, Nev., and a supervising engineer at Sacramento, Calif., report to the Chief Engineer. Twenty superintendents and engineers in charge of completed projects report to the Supervisor of Operation and Maintenance at Washington. The 56 field offices, including the Denver office, have a combined personnel of 5,936.

An Assistant Commissioner, Roy B. Williams, was appointed during the fiscal year.

RECLAMATION TABLE 1.—Consolidated Financial Statement, June 30, 1938

DEBIT SIDE	
Construction account:	
Primary projects:	
Cost of irrigation works:	
Original construction.....	\$323,719,621.20
Supplemental construction.....	12,671,606.15
Value of works taken over.....	2,196,625.12
	<hr/>
Total construction cost.....	\$338,587,852.47
Operation and maintenance prior to public notice, net.....	\$2,825,722.30
Operation and maintenance deficits and arrearages funded with construction.....	5,863,497.77
Penalties on water-right charges funded with construction.....	3,239,857.67
	<hr/>
	11,929,077.74
	<hr/>
Total.....	350,516,930.21
Less income items:	
Construction revenues.....	\$7,450,671.15
Contributed funds.....	1,866,795.10
Nonreimbursable appropriation, Rio Grande Dam.....	1,000,000.00
	<hr/>
	10,317,466.25
	<hr/>
	340,199,463.96
Less abandoned works, nonreimbursable cost, and charge-offs.....	17,117,514.60
	<hr/>
Balance payable.....	\$323,081,949.36
Palo Verde flood protection, cost of construction and repairs.....	48,806.46
Secondary projects and general investigations:	
Cost of surveys and investigations.....	\$4,343,703.39
Less contributed funds.....	620,459.32
	<hr/>
	3,723,244.07
General offices' expense undistributed.....	920,472.07
Plant and equipment.....	1,823,043.91
Materials and supplies.....	3,549,388.29
Accounts receivable:	
Current accounts.....	\$1,663,505.11
Deferred accounts.....	214,577,006.04
	<hr/>
	216,240,511.15

RECLAMATION TABLE 1.—Consolidated Financial Statement, June 30, 1938—Con.

DEBIT SIDE—Continued

Undistributed clearing cost accounts.....		\$256,296.97
Unadjusted debits, disbursement vouchers in transit.....		9,681.68
Cash:		
Balance on hand:		
Reclamation fund.....	\$12,952,325.69	
General fund.....	27,033,990.66	
National Industrial Recovery and P. W. A. allotments.....	5,010,194.60	
Emergency Relief allotments.....	8,282,613.57	
Funds transferred from other departments.....	147,755.36	
Contributed funds.....	60,776.22	
		\$53,487,656.10
In special deposit and in transit.....		95,232.19
		53,582,888.29
Total debits.....		603,236,282.25

CREDIT SIDE

Security for repayment of cost of irrigation works: Contracted construction repayments....	\$263,540,210.10
Current accounts payable.....	4,496,286.71
Deferred and contingent obligations.....	1,200,571.42
Reserves and undistributed profits.....	10,364,819.57
Operation and maintenance results, surplus.....	802,525.95
Unadjusted credits, collection vouchers in transit.....	855.43
Government aid for reclamation of arid lands:	
Reclamation fund.....	\$169,463,715.57
Advances to reclamation fund:	
Treasury loan (act of June 25, 1910).....	\$20,000,000.00
Less amount repaid.....	10,000,000.00
	10,000,000.00
Treasury loan (act of Mar. 4, 1931).....	5,000,000.00
	\$15,000,000.00
National Industrial Recovery and P. W. A. allotments.....	47,671,000.00
Emergency Relief allotments.....	51,103,466.33
Funds transferred from other departments.....	2,419,176.04
General fund—Central Valley project.....	19,380,000.00
General fund—Grand Coulee Dam.....	33,750,000.00
Other general fund appropriations.....	6,371,695.99
	345,159,053.93
Less nonreimbursable appropriation, Rio Grande Dam.....	1,000,000.00
	344,159,053.93
Less impairment of funds:	
Abandoned works.....	\$2,830,934.62
Nonreimbursable construction cost.....	860,742.32
Operation and maintenance cost uncollectible.....	453,272.39
Charge-offs (act of May 25, 1926).....	14,681,872.14
Washington office cost since Dec. 5, 1924.....	2,192,703.02
Attendance at meetings.....	1,815.90
Giving information to settlers, cost.....	11,238.17
Prepaid civil-service retirement funds.....	2,340.33
Operation and maintenance administration.....	31,479.62
Returned to Treasury, miscellaneous receipts.....	90.30
	21,066,488.81
	323,092,565.12
Less impounded funds, economy acts.....	261,552.05
	322,831,013.07
Total credits.....	603,236,282.25

BUREAU OF RECLAMATION

77

State and project	Construction cost		Operation and maintenance before public notice (net)		Operation and maintenance deficits and penalties		Construction revenues, contributed funds, and nonreimbursable appropriations (contra)		Abandoned works, nonreimbursable cost and authorized charge-offs	Total repayable	
	Fiscal year 1938	To June 30, 1938	Fiscal year 1938	To June 30, 1938	Fiscal year 1938	To June 30, 1938	Fiscal year 1938	To June 30, 1938		Fiscal year 1938	To June 30, 1938
Arizona:											
Gila.....	\$2,122,027.04	\$3,035,277.52								\$2,122,027.04	\$3,035,277.52
Salt River.....	2,987,508.77	18,016,754.58								3,967,088.74	16,461,573.98
Yuma auxiliary.....	1,237.00	902,060.50			10.21	590.36				1,236.79	901,555.89
Arizona-California: Yuma.....		9,374,406.10		\$10,895.89	155.74	207,063.71				3,481.17	9,733,081.38
California:											
Central Valley.....	1,418,290.05	2,770,059.65								1,418,290.05	2,770,059.65
Orland.....		2,401,049.57								26,345.97	2,418,783.41
Colorado:											
Colorado-Big Thompson.....	223,072.26	223,072.26								223,072.26	223,072.26
Fruitgrowers Reservoir.....	29,631.19	29,631.19								29,631.19	29,631.19
Grand Valley.....		5,020,931.34				4,529.40				968.10	4,081,374.55
Pine River.....	206,157.37	255,408.22								206,157.37	255,408.22
Uncompangre.....	713,253.79	8,366,469.00								713,024.03	7,888,220.13
Idaho:											
Boise.....	247,062.21	16,686,396.71								168,577.85	17,137,955.29
Boise-Payette.....	813,661.49	1,786,605.21								813,661.49	1,786,605.21
King Hill.....		1,905,918.80									
Mimidoka.....	1,725.00	19,232,057.90									
Upper Snake River.....	824,266.38	2,006,645.03									
Kansas: Garden City.....		342,963.08									
Montana:											
Bitter Root.....	60,000.00	947,641.05								60,000.00	1,464,279.00
Buffalo Rapids.....	186,266.42	186,266.42								186,266.42	186,266.42
Chain Lakes.....	546,027.51	708,215.68								546,027.51	768,215.68
Frenchtown.....	9,533.73	263,272.77								12,967.12	266,706.16
Huntley.....		1,559,590.46									
Milk River.....	1,195.43	6,924,191.50									
Sun River.....	274,168.14	8,561,812.03								8,201.10	1,862,804.92
Montana-North Dakota: Lower Yellowstone.....											
Nebraska-Wyoming: North Platte.....											
	1,445.17	19,331,704.12									
										1,445.50	20,972,439.37

1 Contra.

State	1970	1980	1990	2000	2010	2020
Washington:						
Grand Coulee	15,362, 112.60	60,613, 865.45	147,766.87	33,477.69	143,593.38	15,328,634.91
Okanogan	1,451,129.45	1,451,129.45	26,882.64	7,496.28	997,861.70	60,470,272.07
Yakima	67,732.93	26,260,161.08	114.68	154,374.40	4,214.60	425,887.24
Yakima-Roza	2,131,440.69	3,656,462.63	164,357.08	58,915.77	511,191.01	25,884,773.39
Wyoming:						
Kendrick	4,513,397.97	10,417,728.59	6,137.27	2,932.82	5,955.84	8,802.48
Riverton	580,549.40	5,359,668.40	6,137.27	1,032.00	22,739.65	4,510,465.15
Shoshone	8,363.65	10,094,126.54	35,244.37	54,595.68	646,655.96	585,654.67
Shoshone-Heart Mountain	954,224.87	1,784,726.56	907,235.88	120.00	1,548,129.47	1,471,140.34
Total	38,813,156.13	338,587,852.47	2,825,722.30	9,103,355.44	10,137,459.16	8,404,821.36
			1,340,246.20		17,117,514.60	1,784,606.56
					40	323,201,956.45

BOULDER CANYON PROJECT

RECLAMATION TABLE 3.—Financial Statement June 30, 1938

ASSETS AND OTHER DEBITS

I. INVESTMENTS

102	Fixed capital under construction.....	\$111,045,485.09	
103	Other physical properties.....	1,421,862.58	
104	Investigations—Colorado River Basin.....	229,961.57	
104	Investigations—Parker-Gila project.....	65,222.24	
105	Other capital expenditures—Interest during construction.....	17,072,145.84	
106	Earnings and expenses during construction.....	¹ 572,196.68	
Total investments (schedule 2).....			\$129,262,480.64

II. CURRENT AND ACCRUED ASSETS

121	Treasury cash:		
	For advances to Colorado River Dam fund.....	\$4,640,265.49	
	Colorado River Dam fund.....	1,755,570.57	
	N. I. R. A.—Parker-Gila project.....	9,090.67	
	Collections in transit.....	336,495.82	
	Total Treasury cash (schedule 1).....	6,741,422.55	
122	Disbursing officers' cash (schedule 1).....	355,704.60	
124	Accounts receivable.....	27,088.48	
Total current and accrued assets.....			7,124,215.63

IV. DEFERRED AND UNADJUSTED DEBITS

141	Clearing and apportionment accounts.....	¹ \$86,115.26	
143	Field cost adjustments.....	35,682.95	
145	Jobbing accounts.....	25,062.34	
146	Prepayments.....		
171	Unadjusted debits.....	7,600.97	
Total deferred and unadjusted debits.....			¹ 17,769.00
Total assets and other debits.....			136,368,927.27

LIABILITIES AND OTHER CREDITS

X. CAPITAL AND LONG-TERM LIABILITY

205	Long-term liability—U. S. Treasury authorized appropriation.....	\$126,500,000.00	
	Less:		
161	Authorized but not appropriated.....	9,190,000.00	
Total long-term liability:			
205.2	Appropriated but not advanced.....	4,640,265.49	
205.3	Appropriated and advanced.....	112,669,734.51	
205.4	Less: Impounded, Legislative Economy Act.....	¹ 137,653.66	
206	N. I. R. A. allotment Parker-Gila project.....	93,000.00	
207	Interest on advances to Colorado River Dam fund.....	18,746,514.26	
208	Judgments—Court of Claims.....	37,766.29	
			136,049,626.89

XI. CURRENT AND ACCRUED LIABILITIES

211	Audited accounts payable:		
211.1	Contractors earnings—current.....		
211.11	Contractors earnings—holdback.....		
211.2	Labor.....	\$62,174.46	
211.3	Purchases.....	3,983.52	
211-4	Freight and express.....	99,045.43	
211.5	Passenger fares.....	750.47	
211.6	Rights-of-way.....		

¹ Contra.

BOULDER CANYON PROJECT—Continued

RECLAMATION TABLE 3.—Financial Statement June 30, 1938—Continued

LIABILITIES AND OTHER CREDITS—Continued

XI. CURRENT AND ACCRUED LIABILITIES—Continued

211.9	Miscellaneous.....	\$6,038.29
211.91	Refunds.....	1.78
Total audited accounts payable.....		171,993.95
219	Accrued interest.....	
Total current and accrued liabilities.....		\$171,993.95

XIII. DEFERRED AND UNADJUSTED CREDITS

231	Unadjusted credits.....	2,076.36
-----	-------------------------	----------

XV. RESERVES

258.	Reserve for amortization of long-term debt and payment to States.....	145,230.07
Total liabilities and other credits.....		136,368,927.27

BOULDER CANYON PROJECT

RECLAMATION TABLE 4.—Appropriations and Cash Statement June 30, 1938

	Regular appropriation	N. I. R. A. allotment	Total	N. I. R. A. Parker-Gila project
TREASURY CASH				
Appropriations and allotments.....	\$79,310,000.00	\$38,000,000.00	\$117,310,000.00	\$93,000.00
Advances to Colorado River Dam fund.....	74,670,000.00	37,999,734.51	112,669,734.51	
Balance not advanced.....	4,640,000.00	265.49	4,640,265.49	
Colorado River Dam fund—				
Advanced from appropriation to fund.....	74,670,000.00	37,999,734.51	112,669,734.51	
Collections deposited in fund.....	3,597,764.68	22,973.29	3,620,737.97	5,168.92
Total advances and collections.....	78,267,764.68	38,022,707.80	116,290,472.48	98,168.92
Disbursements by General Accounting Office.....	6,082,692.20	54,723.63	6,137,415.83	
Advances to disbursing officers.....	70,431,427.98	37,966,058.10	108,397,486.08	89,078.25
Total withdrawals.....	76,514,120.18	38,020,781.73	114,534,901.91	89,078.25
Balance.....	1,753,644.50	1,926.07	1,755,570.57	9,090.67
Repay collections in transit.....	2,008.56		2,008.56	
Miscellaneous collections in transit.....	334,487.26		334,487.26	
Total Treasury cash (G. L. 121).....	6,730,140.32	2,191.56	6,732,331.88	9,090.67
DISBURSING OFFICERS' CASH				
Advances and appropriation transfer adjustment.....	70,441,661.87	37,972,687.98	108,414,349.85	89,078.25
Disbursements by disbursing officers.....	70,115,482.41	37,964,002.16	108,079,484.57	68,091.00
Disbursing officers' checking balance.....	326,179.46	8,685.82	334,865.28	20,987.25
Collections by disbursing officers.....	3,936,153.18	29,352.17	3,965,505.35	5,168.92
Collections deposited and appropriation transfer adjustment.....	3,936,301.11	29,352.17	3,965,653.28	5,168.92
Collections not deposited.....	¹ 147.93		¹ 147.93	
Total disbursing officers' cash (G. L. 122).....	326,031.53	8,685.82	334,717.35	20,987.25

¹ Contra.

ALL-AMERICAN CANAL

RECLAMATION TABLE 5.—Financial Statement June 30, 1938

ASSETS AND OTHER DEBITS

I. INVESTMENTS

102 Fixed capital under construction.....	\$23, 519, 095. 03
---	--------------------

II. CURRENT AND ACCRUED ASSETS

121 Treasury cash:

For advances to Colorado River Dam fund.....	\$2, 625, 000. 00
Colorado River Dam fund.....	168, 490. 16
N. I. R. A. and E. R. A. allotments.....	341, 259. 32
Contributions—Imperial Irrigation District.....	26, 133. 72
Collections in transit.....	402. 76

Total Treasury cash.....	3, 161, 285. 96
--------------------------	-----------------

122 Disbursing officers' cash.....	1, 532, 849. 27
------------------------------------	-----------------

124 Accounts receivable.....	59, 386. 24
------------------------------	-------------

Total current and accrued assets.....	4, 753, 521. 47
---------------------------------------	-----------------

IV. DEFERRED AND UNADJUSTED DEBITS

141 Clearing and apportionments.....	\$8, 155. 17
--------------------------------------	--------------

143 Field cost adjustments.....	71, 169. 70
---------------------------------	-------------

171 Unadjusted debits.....	16, 378. 82
----------------------------	-------------

Total deferred and unadjusted debits.....	79, 393. 35
---	-------------

Total assets and other debits.....	28, 352, 009. 87
------------------------------------	------------------

LIABILITIES AND OTHER CREDITS

X. CAPITAL AND LONG-TERM LIABILITY

205 Long-term liability—U. S. Treasury authorized appropriation.....	\$38, 500, 000. 00
--	--------------------

Less:

161 Authorized but not appropriated.....	10, 000, 000. 00
--	------------------

Total long-term liability:

205.2 Appropriated but not advanced.....	2, 625, 000. 00
--	-----------------

205.3 Appropriated and advanced.....	24, 875, 000. 00
	\$27, 500, 000. 00

XI. CURRENT AND ACCRUED LIABILITIES

211 Audited accounts payable:

211.1 Contractors' earnings—current.....	\$341, 408. 91
--	----------------

211.11 Contractors' earnings—holdback.....	321, 221. 74
--	--------------

211.2 Labor.....	17, 581. 20
------------------	-------------

211.3 Purchases.....	28, 670. 74
----------------------	-------------

211.4 Freight and express.....	75, 456. 17
--------------------------------	-------------

211.5 Passenger fares.....	394. 76
----------------------------	---------

211.6 Rights of way.....	7, 684. 80
--------------------------	------------

211.9 Miscellaneous.....	386. 96
--------------------------	---------

211.91 Refunds.....	5, 258. 47
---------------------	------------

Total current and accrued liabilities.....	798, 063. 75
--	--------------

XII. OTHER CREDITS

226 Contributed funds—Imperial and Coachella Irrigation District.....	50, 000. 00
---	-------------

XIII. DEFERRED AND UNADJUSTED CREDITS

231 Unadjusted credits.....	\$2, 194. 74
-----------------------------	--------------

231.3 Unadjusted credits—Yuma project.....	52. 36
--	--------

Total deferred and unadjusted credits.....	2, 247. 10
--	------------

XV. APPROPRIATED SURPLUS

251 Appropriated surplus not specifically invested.....	1, 699. 02
---	------------

Total liabilities and other credits.....	28, 352, 009. 87
--	------------------

¹ Contra.

ALL-AMERICAN CANAL

RECLAMATION TABLE 6.—Appropriation and Cash Statement June 30, 1938

	N. I. R. A. allotment	P. W. A. allotment	Emergency Re- lief allotment	Total	Regular ap- propriation	Imperial Irrigation District
TREASURY CASH						
Appropriated and allotments.....	\$6,000,000.00	\$3,000,000.00	\$10,000,000.00	\$19,000,000.00	\$8,500,000.00	\$50,000.00
Advanced to Colorado River Dam fund.....					5,875,000.00	
Balance not advanced.....					2,625,000.00	
Colorado River Dam fund:						
Advanced to Colorado River Dam fund.....	18,547.29	3,090.60	23,054.35	44,692.24	5,875,000.00	
Collections deposited.....					118,872.12	
Total advances, allotments, etc.....	6,018,547.29	3,003,090.60	10,023,054.35	19,044,692.24	5,993,872.12	50,000.00
Disbursements by General Accounting Office.....	61,164.24	16.17	551.97	61,732.38	3,381.96	
Advances to disbursing officers.....	5,908,703.36	2,992,997.18	9,740,000.00	18,641,700.54	5,822,000.00	50,000.00
Total withdrawals.....	5,939,867.60	2,993,013.35	9,740,551.97	18,703,432.92	5,825,381.96	50,000.00
Balance.....						
Repay collections in transit.....	48,679.69	10,077.25	282,502.38	341,259.32	108,490.16	
Miscellaneous collections in transit.....	258.30	20.10		258.30	124.36	
Total Treasury cash (G. L. 121).....	48,937.99	10,077.25	282,502.38	341,517.62	2,793,634.62	
DISBURSING OFFICERS' CASH						
Advances and appropriation transfer adjustments.....	5,908,878.34	2,992,997.18	9,740,000.00	18,641,875.52	5,822,000.00	50,000.00
Disbursements by disbursing officers.....	5,808,715.39	2,873,837.44	9,378,625.55	18,061,178.38	4,869,847.87	23,866.28
Disbursing officers' check balance.....	100,162.95	119,159.74	361,374.45	580,697.14	952,152.13	26,133.72
Collections by disbursing officers.....	18,909.82	3,090.60	23,054.35	45,054.77	119,016.58	50,000.00
Collections deposited and appropriations transferred.....	18,909.82	3,090.60	23,054.35	45,054.77	119,016.58	50,000.00
Collections not deposited.....						
Disbursing officers' cash balance.....	100,162.95	119,159.74	361,374.45	580,697.14	952,152.13	26,133.72

THE BONNEVILLE PROJECT

J. D. Ross, *Administrator*

THE Bonneville project, now an active and developing organization, was created by act of the Seventy-fifth Congress (approved August 20, 1937) for making available for use and sale the electric energy generated by the Bonneville plant on the Columbia River. Pursuant to the provisions of this act, the Secretary of the Interior on October 12, 1937, appointed Mr. J. D. Ross, of the Securities and Exchange Commission, to the office of Administrator of the Bonneville project. An office was opened in Portland, Oreg., on November 15, 1937. The Bonneville plant itself was ready for operation when it was dedicated by the President on September 12, 1937.

The first funds made available to the Bonneville project were supplied by an appropriation of \$100,000 in the third deficiency bill of the Seventy-fifth Congress. This was to cover the organization and preliminary work in the determination of policies and initial development of the program.

The Administrator, in compliance with the basic policy expressed in the Bonneville Act, has directed his program for the distribution of the power generated by the Bonneville plant so as

“to encourage the widest possible use of all electric energy that can be generated and marketed * * * ” and to “provide for uniform rates or rates uniform throughout prescribed transmission areas in order to extend the benefits of an integrated transmission system and encourage the equitable distribution of the electric energy developed at the Bonneville project.”

The Administrator conducted public hearings during the period March 10 to 18, 1938, in several cities of Idaho, Oregon, and Washington. On the basis of these hearings and engineering investigations a rate schedule was prepared as follows:

	<i>Per kilowatt-year</i>
A-1 Power available full time at the Bonneville plant.....	\$14. 50
B-1 Power available part time at the Bonneville Plant.....	9. 50
C-1 Power available full time on the lines of the Bonneville project....	17. 50
D-1 Power available part time on the lines of the Bonneville project---	11. 50

These rates, approved June 8, 1938, by the Federal Power Commission, are among the lowest of record, and are such as to induce and encourage the use of electric energy over a large geographical area and in a variety of types of load.



AIR VIEW OF BONNEVILLE DAM, THE SPILLWAY, POWERHOUSE, LOCKS, AND FISHWAYS.

Concurrently with the development of policies and rates the Administrator has organized a staff for engineering design and construction. The project has received an additional appropriation of \$3,500,000, which will be expended for the construction of transmission lines and substations. The construction program contemplated for completion during 1940 is shown in the map.

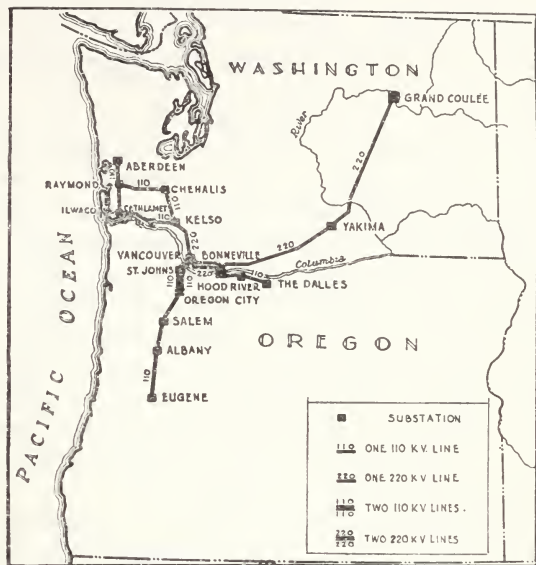
This program will provide transmission lines designed for operation at 220,000 volts, reaching from Bonneville to Grand Coulee, and from Bonneville through Vancouver and Kelso to Chehalis, Wash.; also, lines designed for 110,000 volts, from Chehalis to Aberdeen, from Kelso to Ilwaco and Raymond, in Washington; and from Bonneville to The Dalles and Vancouver to Eugene in Oregon.

The construction of these lines will require 357 miles of three-conductor lines for 220,000 volt service, and 278 miles of three-conductor lines for 110,000 volt service. For these lines, about 3,500 towers weighing a total of 25,000 tons, 1,200 miles of 220 kv conductor weighing a total of 4,500 tons, 850 miles of 110 kv conductor weighing a total of 1,500 tons and about a quarter of a million large-size, suspension-type porcelain insulators. Some of the lines will be supported by steel towers, and some will be supported by wooden poles.

Associated with these lines are planned substations at Yakima, North Bonneville, Vancouver, Kelso, Chehalis, Aberdeen, Raymond, and Ilwaco, Wash.; and St. Johns (in Portland), Oregon City, Salem, Albany, Eugene, Hood River, and The Dalles, Oreg.

The present appropriation is not sufficient to provide for all of the contemplated construction, but additional allotments are expected under authorizations of the Public Works Administration. Approximately \$15,000,000 will be required to complete the program now contemplated.

Many inquiries for Bonneville power are being received from prospects in various localities, and numerous industrial organizations are considering possible use of energy at sites near the Bonneville plant.



A chart of the Bonneville Project to be completed in 1940.

A glance at the accompanying map will suggest the enormous possibilities for utilization of energy from Bonneville. The lines shown are traced through the populous and productive regions which are tributary to Portland, Oreg., and one high-voltage line will reach to Grand Coulee. This Grand Coulee line will serve for the transmission and interchange of power in a network of high-voltage lines which will ultimately be required to distribute the energy of the Columbia River plants. Bonneville and Grand Coulee are the first two installations of a system of Columbia River plants which will have an ultimate installed capacity of about 8,000,000 kilowatts.

The Bonneville plant, itself, now has a generating capacity of 86,000 kilowatts in two turbogenerator units. When finally completed, Bonneville will have 10 units with a combined capacity of approximately 500,000 kilowatts. The present two units of the Bonneville plant could serve a residential population about equal to that of the city of Portland, Oreg. However, 50 percent of this initial plant capacity will be reserved for sale to public bodies and cooperatives. Not more than 20 percent of the installed capacity of the Bonneville plant may be used to furnish power to industrial customers who may locate near the dam.

The demand for Bonneville power is expected to develop from three causes. First, power now generated in the vicinity of Bonneville, from fuel, is comparatively expensive; second, the private utilities in this region are installing very little new generating equipment; and, third, this will be the first time that energy at such a low price as half a cent per kilowatt-hour has been available in regions remote from large generating plants.

It has been found that the uses of electric energy increase both in variety and amount when rates are materially reduced. It appears probable that rates in this region will be reduced to about half or even less than half of those now prevailing. A reduction of this magnitude probably will result, within a year after the completion of the Bonneville project lines now contemplated, in a demand for all of the output the Bonneville plant can produce. The load should increase to about 200,000 kilowatts by the year 1943, at which time Bonneville units Nos. 3 and 4, included in the authorization of six made by the last Congress, will have been installed. By that time also, additional project lines will probably have been required. The official provision for these additional units makes it feasible to establish schedules of construction on a firm basis, and to undertake contracts for the distribution of increasing amounts of energy.

GENERAL LAND OFFICE

Fred W. Johnson, *Commissioner*

READJUSTMENT of its activities to meet the primary responsibilities placed upon it by a universally recognized need for prudent conservation of the natural resources on the public domain, was the outstanding problem met by the General Land Office during the fiscal year.

Through careful regrouping of personnel, and the installation of modern business practices, a greatly improved organization was maintained with which to administer the provisions of law and Executive orders affecting the national conservation program.

At the same time, operations of the General Land Office resulted in the return to the Federal Treasury of \$5 for every \$1 expended upon its administrative activities. Largest in any year since 1927, total cash receipts aggregated \$8,447,374.97 while total expenditures from appropriations made for the conduct of the Office was \$1,821,681. Exceeding last year's receipts by \$1,047,535.03, returns of the present fiscal year showed an excess of receipts over expenditures of \$6,625,-693.97.

The situation under the conservation program now confronting this Office, which for 150 years has handled all the negotiations of the Government with respect to its public lands, may best be realized from a brief survey of the national land picture as it was and as it is today.

Before 1934, the work of the General Land Office consisted mainly in disposing of and in carefully recording the transfers of available tracts of public land. There was plenty of land to be allocated, and the duty of the General Land Office was to make sure that disposals were made in accordance with the law.

With the enactment of the Taylor Grazing Act in 1934, new fields of activity were placed within the General Land Office for administration. Under that act, and in accordance with the provisions of Executive orders, all public lands were withdrawn from disposal. No allocation of any of the public domain may now be made until after scientific classification to determine the highest use to which it can be put. In addition to the problems encountered in the necessity for classification of all the public domain before it can be disposed

of, administration of mineral development upon the public domain and grazing activities on public land tracts not included in grazing districts are among the responsibilities of the General Land Office.

A highly important field of activity confronting this Bureau under the new program is the necessity for conducting land disposal negotiations under the provisions of the act of June 1, 1938 (Public No. 577), which authorizes the Secretary of the Interior to sell or lease tracts of not exceeding 5 acres of public land for cabin, home-site, convalescent, recreational, or business purposes. Classification must be made of the public lands to determine the areas suitable for disposition under the terms of this law.

The act of August 28, 1937 (50 Stat. 874), provided a comprehensive land use program for the revested Oregon and California Railroad and Coos Bay Wagon Road grant lands, in Oregon. Extensive land classifications also will be required in connection with the prudent development of this area. Headquarters for this work are maintained at Portland, Oreg.

CADASTRAL ENGINEERING SERVICE

The Cadastral Engineering Service of the General Land Office is charged with the execution of cadastral surveys and resurveys of the public lands of the United States proper and Alaska, the supervision of mineral surveys for patent, and the preparation of the technical and legal records of the work performed.

During the year field projects were executed in 21 States and the Territory of Alaska under 208 separate groups, 106 of which in 17 States were of resurveys. In these areas 34,480 linear miles, embracing 5,985,310 acres, were surveyed and resurveyed, exclusive of engineering investigations and many types of miscellaneous and special projects not measurable on a quantity basis.

Office work in all branches was maintained on a current basis. There were constructed 282 township base plats, 127 color overlay sheets, 127 supplemental plats, and field notes were prepared in final form for the permanent record for all surveys relating thereto. In addition, 172 mineral surveys, embracing 521 locations, were examined, platted, and approved.

Requests by other Federal agencies for surveys and resurveys to meet the requirements of administration, conservation, and rehabilitation of the national estate, continued in increasing number and geographic scope. Applicants included the Forest Service, Division of Grazing, Bureau of Reclamation, National Park Service, Geological Survey, Office of Indian Affairs, and the Soil Conservation Service.

Accepted surveys and resurveys.—There were accepted and placed on file plats representing 2,385,337 acres of original surveys of public

lands, and, in addition, 1,801,883 acres of lands resurveyed, comprising an aggregate area of 4,187,220 acres.

Maps, plats, and diagrams.—The wall map of the United States has been revised to show changes since the publication of the 1936 edition, and preliminary action taken for printing the 1938 edition.

There have been prepared 211 miscellaneous maps, plats, diagrams, and tracings.

Photolithographic copies, etc.—There were sold 7,937 photolithographic copies of township plats, for which \$3,968.50 was received, and 9,972 copies were furnished to other bureaus for official use. There were 932 maps mounted and distributed for official use, and appropriate distribution was made of 6,855 map publications and 91,580 circulars.

CIVILIAN CONSERVATION CORPS

Advancing conservation of valuable natural resources on the public domain, the work of the Civilian Conservation Corps was carried on during the fiscal year from four camps under the jurisdiction of the General Land Office. Two of these camps are engaged in the control of the coal fires on federally owned coal beds in the Little Thunder Basin, Wyo.

During the fiscal year not a single lost-time accident to any enrollee occurred, notwithstanding the extremely hazardous nature of the work involved. Camps have been assigned to this work since the inception of the C. C. C. program in 1933 and during all of that time not a single lost-time accident has been reported, although over 100,000 man-shifts have worked on these fires and over 2,700,000 man-miles have been traveled by truck in the fire control work.

During the year work was conducted on 14 different projects, involving 13 separate and distinct underground coal fires and one emergency forest fire, as well as incidental undertakings such as construction of roads to reach the fires, etc.

Two C. C. C. camps were transferred to the jurisdiction of the General Land Office from the Forest Service on June 1, 1938, for conservation work on the revested and reconveyed lands in Oregon. While these camps were engaged under the supervision of this Office for only a small portion of the fiscal year they were actively employed in fire suppression and fire hazard reduction work, thus contributing to the conservation of the valuable timber on those areas.

REVESTED OREGON AND CALIFORNIA RAILROAD AND RECONVEYED COOS BAY WAGON ROAD GRANT LANDS

The act of August 28, 1937 (50 Stat. 874), provided a comprehensive land-use conservation program, which will require extensive field examination and classification of all the revested Oregon and Cali-

fornia Railroad and reconveyed Coos Bay Wagon Road grant lands.

Pending completion of such classification and determination of the annual sustained yield capacity of the timber growing area and in order to prevent the shutting down of operating lumbering concerns with resultant unemployment and hardship to a large number of persons, timber cutting has proceeded under temporary regulations, embodying certain definite and desirable conservation features as to sound forestation practices, reforestation guarantees, and fire prevention. On July 7, 1938, permanent regulations were approved embodying these and other conservation features. The old practice of issuing patent for the timber purchased has been abandoned in favor of the execution and approval of a timber contract and the period for the cutting and removal of the timber has been reduced from 10 to 2 years.

Transactions concerning revested and reconveyed lands follow:

Restored, etc.—No restorations to homestead entry were made, and 243.84 acres were reclassified as timber land.

Timber sales.—Eighty sales of timber on the revested Oregon and California Railroad grant lands were made, involving 9,916.40 acres of land, containing 262,162,000 feet board measure of timber, for which the sum of \$460,701.55 was received. Total sales to June 30, 1938, 1,218, involving 144,551.13 acres, containing 3,593,249,980 feet board measure of timber, for which a total of \$7,930,182.69 was received.

Seven sales of timber on the reconveyed Coos Bay Wagon Road grant lands were made, involving 1,124 acres of land, containing 31,413,000 feet board measure of timber, for which the sum of \$108,637.37 was received. Total sales to June 30, 1938, 129, involved 20,864.78 acres, containing 829,790,000 feet board measure of timber, for which a total of \$1,944,302.04 has been received.

Timber rights terminated.—Rights under timber patents were terminated in 39 cases.

RECEIPTS AND EXPENDITURES

The total cash receipts from sales, leases, and other disposals of public lands (including receipts from copies of records, sales of Government property, etc.) were \$8,393,511.69, and from sales of Indian lands \$53,863.28, an aggregate of \$8,447,374.97, all of which was deposited in the Treasury. The total expenditures from appropriations made for the conduct of the Office was \$1,821,681. The excess of receipts over expenditures was \$6,625,693.97. The receipts were the largest in any year since 1927, exceeding last year's receipts by \$1,047,535.03.

Receipts under Mineral Leasing Acts.—Receipts from bonuses, royalties, and rentals under laws providing for the leasing rights on the public domain (including royalties and rentals on potash deposits

and royalties on coal leases in Alaska) aggregated \$6,675,973.26, of which \$6,527,113.62 was received under the act of February 25, 1920 (41 Stat. 437). The largest receipts under this act were from lands in California, the amount being \$3,422,595.68. Wyoming was second with \$1,679,357.71. Receipts from other States follow: New Mexico, \$804,739.70; Louisiana, \$247,807.30; Colorado, \$122,456.83; Utah, \$121,980.25; Montana, \$95,703.99; North Dakota, \$25,051.47; Alabama, \$5,113; Idaho, \$1,674.38; South Dakota, \$451.31; Nevada, \$160; and Mississippi, \$22. Under the provisions of the mineral leasing act cited, each State receives 37½ percent of the receipts thereunder from the public lands within its borders, the reclamation fund receives 52½ percent, and the other 10 percent remains in the Treasury of the United States as miscellaneous receipts.

Receipts under the Taylor Grazing Act.—The amounts received as fees on grazing licenses, by grazing districts, and by States, and the receipts for fees and rentals under section 15 of the act, are as follows:

	Fees on licenses from grazing districts		Fees and rentals under section 15	State totals
	District	Amount		
Arizona.....	1	\$20,989.33	-----	-----
	2	3,993.38	-----	-----
	4	13,392.55	-----	-----
		38,375.26	\$9,874.32	\$48,249.58
California.....	1	7,610.82	-----	-----
	2	17,216.36	-----	-----
		24,827.18	718.95	25,546.13
Colorado.....	1	18,679.82	-----	-----
	2	4,927.62	-----	-----
	3	12,771.06	-----	-----
	4	7,249.62	-----	-----
	6	5,128.51	-----	-----
		48,756.63	2,623.38	51,380.01
Idaho.....	1	26,195.40	-----	-----
	2	27,326.42	-----	-----
	3	15,733.37	-----	-----
	4	9,324.01	-----	-----
		78,579.20	1,509.68	80,088.88
Montana.....	1	2,862.40	-----	-----
	2	3,178.89	-----	-----
	3	2,177.40	-----	-----
	4	1,048.05	-----	-----
	5	3,314.75	-----	-----
		12,581.49	3,066.12	15,647.61
Nevada.....	1	40,519.82	-----	-----
	2	28,730.25	-----	-----
	3	14,056.51	-----	-----
	4	24,474.59	-----	-----
	5	1,386.32	-----	-----
		109,197.49	-----	109,197.49

	Fees on licenses from grazing districts		Fees and rentals under section 15	State totals
	District	Amount		
New Mexico.....	2	34,635.85	-----	-----
	3	31,938.26	-----	-----
	4	28,354.45	-----	-----
	5	10,077.33	-----	-----
	6	64,892.82	-----	-----
		169,898.71	1,069.82	170,968.53
Oregon.....	1	1,137.97	-----	-----
	2	15,497.15	-----	-----
	3	12,900.31	-----	-----
	4	5,814.01	-----	-----
	5	4,227.03	-----	-----
	6	2,946.73	-----	-----
	7	889.87	-----	-----
		43,413.07	1,151.72	44,564.79
South Dakota.....			20.00	20.00
Utah.....	1	8,407.49	-----	-----
	2	28,062.34	-----	-----
	3	34,939.81	-----	-----
	4	15,052.32	-----	-----
	5	20,412.90	-----	-----
	6	23,298.95	-----	-----
	7	18,820.65	-----	-----
	8	15,697.27	-----	-----
		164,691.73	-----	164,691.73
Washington.....			920.21	920.21
Wyoming.....	1	20,857.91	-----	-----
	2	24,561.57	-----	-----
	3	33,075.64	-----	-----
	4	38,738.58	-----	-----
	5	9,944.58	-----	-----
		127,178.28	26,977.87	154,156.15
Grand total.....		817,499.04	47,932.07	865,431.11

Distribution of receipts.—Receipts from all sources, aggregating \$8,447,374.97, as shown above, are distributed under the law approximately as follows: Reclamation fund, \$3,632,307.52; for range improvements, \$216,357.78; to public land States and certain counties within such States, \$3,411,493.70; general fund, \$1,119,350.40; and to various Indian tribes, \$67,865.57.

Under the provisions of the Taylor Grazing Act, the States within which the lands are situated receive 50 percent of the receipts from public lands and 25 percent of the receipts from ceded Indian lands; 25 percent of the receipts from both public and ceded Indian lands is available, when appropriated by Congress, for range improvements; 50 percent of the receipts from ceded Indian lands is credited to the Indians; and the balance is deposited into the general fund in the Treasury.

Five percent of the net proceeds from cash sales of public lands is paid to the public land States within which such sales were made, and the balance of such receipts from States named in the Reclamation Act is credited to the reclamation fund; the reclamation fund and the States involved receive 90 percent (52½ and 37½ percent

respectively) of the receipts under the mineral leasing act and of receipts from potash deposits leased under the act of February 7, 1927; receipts from sales of reclamation town sites and camp sites and from royalties and rentals from potash deposits leased under the act of October 2, 1917, are credited to the reclamation fund; all of the receipts from proceeds of land and timber in the forfeited Oregon & California Railroad grant to March 1, 1938, will be paid to certain counties in Oregon in lieu of taxes. Receipts from the Oregon & California Railroad grant lands since March 1, 1938, are divided between the general fund in the Treasury and the counties, 25 percent to the general fund and 75 percent to the counties. Twenty-five percent of the proceeds of land and timber in the forfeited Coos Bay Wagon Road grant will be paid to Coos County, Oreg. The receipts from Indian lands (except 37½ percent of royalties from Red River oil lands which are paid to the State of Oklahoma in lieu of taxes) are deposited in the Treasury to the credit of the various Indian tribes. All other moneys are deposited in the Treasury to the credit of the general fund.

The following table shows in detail the distribution of the receipts, insofar as is possible before final settlement of all accounts by the General Accounting Office.

	Distribution in the Treasury				
	General fund	Reclamation and range improvement	State and county funds	Indian trust funds	Total
Sale of public lands.....	\$29,419.44	\$64,914.59	\$3,740.41	-----	\$98,074.44
Fees and commissions.....	14,234.98	67,742.95	-----	-----	81,977.93
Receipts from mineral leases.....	679,003.69	3,426,734.65	2,447,667.61	-----	¹ 6,553,405.95
Receipts from Oregon and California Railroad grant lands.....	41,237.86	-----	463,531.35	-----	² 504,769.21
Receipts from Coos Bay Wagon Road grant lands.....	82,475.00	-----	27,419.39	-----	³ 109,894.39
Receipts under Taylor Grazing Act.....	205,101.13	216,357.78	421,458.92	\$22,513.28	⁴ 865,431.11
Potash royalties and rentals.....	10,444.01	67,226.58	39,165.03	-----	⁵ 116,835.62
Copying fees.....	18,070.05	-----	-----	-----	18,070.05
Power permits.....	16,429.45	-----	-----	-----	16,429.45
Reclamation town lots.....	-----	5,688.75	-----	-----	5,688.75
Sales and leases of Indian lands.....	-----	-----	8,510.99	45,352.29	⁶ 53,863.28
Miscellaneous (including sales of standing timber, coal leases and town lots in Alaska, rent of land, etc.).....	22,934.79	-----	-----	-----	22,934.79
Total.....	1,119,350.40	3,848,665.30	3,411,493.70	67,865.57	8,447,374.97

¹ First and fourth columns contain \$26,292.33 royalties received in Wyoming under the act of June 26, 1926.

² Until Mar. 1, 1938, the entire receipts from these lands were paid to the counties in Oregon in lieu of taxes. Beginning with that date 75 percent of the receipts is paid to the counties and the other 25 percent is deposited into the general fund.

³ 25 percent, exclusive of commissions, is payable to Coos County, Oreg.

⁴ 50 percent of the receipts from public lands and 25 percent of the receipts from ceded Indian lands are paid to the States; 25 percent of the receipts from both public and ceded Indian lands are available, when appropriated by Congress, for range improvements; 25 percent of the receipts from public lands is deposited into the general fund; and 50 percent of the receipts from ceded Indian lands is credited to the Indians.

⁵ All receipts under the act of Oct. 2, 1917 (a total of \$12,395.54), and 52½ percent of the receipts under the act of Feb. 7, 1927 (a total of \$104,440.08), are credited to the reclamation fund. 37½ percent of the receipts under the later act is payable to the States and 10 percent is deposited into the general fund.

⁶ Included in receipts from Indian lands is \$22,795.99 royalties on oil and gas from Kiowa, Comanche, and Apache lands, south half of Red River, Okla., of which the States receives 37½ percent in lieu of taxes.

REPAYMENTS

The act of June 16, 1880 (21 Stat. 287), and the act of March 26, 1908 (35 Stat. 48), as amended by the act of December 11, 1919 (41 Stat. 366), provide for the return of moneys received in connection with the disposal of public lands and covered into the United States Treasury.

Repayment may be made to the land applicant or his heirs or assigns, where lands have been erroneously sold, where payments have been made in excess of lawful requirement, and where applications, entries and proofs have been rejected, no fraud appearing. Under the above cited laws there were stated 72 accounts, allowing repayment of \$4,186.27, and 43 claims were denied. The claims allowed include nine accounts granting repayment of \$819.56 received in connection with sales of Indian reservation lands and repaid from Indian trust funds.

THE PUBLIC LANDS

General withdrawals.—By Executive Order No. 6910 of November 26, 1934, issued under authority of the act of June 25, 1910 (36 Stat. 847), as amended by the act of August 24, 1912 (37 Stat. 497), the vacant, unreserved, and unappropriated public lands in the States of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, and Wyoming were temporarily withdrawn from settlement, location, sale, or entry subject to existing valid rights. This order was amended by Executive Order No. 7048 of May 20, 1935, so as to make it applicable to all lands within the States mentioned upon the cancellation or release of prior entries, selections, or claims, or upon the revocation of prior withdrawals, unless expressly otherwise provided in the order of revocation, and so as to authorize the Secretary of the Interior, in his discretion, to accept title to land offered in exchange under the provisions of section 8 of the Taylor Grazing Act. Executive Order No. 6910 was further amended by Executive Order No. 7235 of November 26, 1935, so as to permit sales under section 14 and the issuance of leases under section 15 of the Taylor Grazing Act, and so as not to debar the recognition or allowance of bona fide nonmetalliferous mining claims. Executive Order No. 6910 was further amended by Executive Order No. 7274 of January 14, 1936, so as to exclude from the operation thereof all lands which were then or might thereafter be included within grazing districts established pursuant to the provisions of the Taylor Grazing Act, so long as such lands remain a part of any such grazing district.

By Executive Order No. 6964 of February 5, 1935, issued under authority of the said act of June 25, 1910, as amended, all public lands in the States of Alabama, Arkansas, Florida, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Nebraska, Oklahoma, Washington,

and Wisconsin were temporarily withdrawn from settlement, location, sale, or entry subject to valid existing rights. Executive Order No. 6964 was amended by Executive Order No. 7363 of May 6, 1936, so as to permit exchanges under section 8, sales under section 14, and the issuance of leases under section 15 of the Taylor Grazing Act.

Executive Orders Nos. 6910 and 6964 were further amended by Executive Order No. 7599 dated April 1, 1937, so as to exclude from their operation all lands identified by survey made after the respective dates of the orders and which upon the date of the acceptance of the survey would otherwise become a part of the school land grant of designated sections to any of the States mentioned in the said orders.

Classification for entry under any law authorized.—Section 7 of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1269), as amended by section 2 of the act of June 26, 1936 (49 Stat. 1976), authorizes the Secretary of the Interior in his discretion, to examine, classify, and open to appropriate entry any lands withdrawn by the Executive order of November 26, 1934, as amended, or the Executive order of February 5, 1935, or any lands within a grazing district, which are more valuable or suitable for the production of agricultural crops than for the production of native grasses and forage crops, or more valuable or suitable for any other use than for the use provided for under said act, or proper for acquisition in satisfaction of any outstanding lien, exchange, or scrip rights or land grant, except that homestead entries may not be allowed for tracts exceeding 320 acres in area. Revised instructions governing the filing of applications for entry, selection, or location under said section 7 were approved June 29, 1937, Circular No. 1353b.

The said section 7, as amended, further provides that locations and entries under the mining laws, including the act of February 25, 1920 (41 Stat. 437), as amended, may be made upon such withdrawn and reserved areas without regard to classification and without restrictions or limitation by any provision of the act.

Unappropriated public lands and public lands in grazing districts.—On June 1, 1938, each register was requested to report by counties and townships the area of the unappropriated and unreserved public lands within and outside of grazing districts in his land district, as of April 30, 1938, treating lands affected by the above-mentioned Executive Orders Nos. 6910 and 6964 as unreserved. Reports have not yet been received from all the offices. The figures, when received, will be compiled and made available for general use. The data as to lands in grazing districts is required in order to effect proper distribution of payments to the States, as provided for by section 10 of the Taylor Grazing Act.

GENERAL STATEMENT

On June 30, 1938, about 6,500,000 acres were embraced in unperfected entries upon which proof of compliance with the law was not

due or had not been presented. In addition, there were pending applications for exchange under the Taylor Grazing Act involving approximately 2,500,000 acres of privately owned and State school land and about the same area of public land.

Exchanges of national forest lands required the examination of abstracts of title involving 183,892 acres.

There were furnished during the year 43,078 certified and uncertified copies of entry papers, plats, field notes, patents etc., for which there were received amounts aggregating \$11,650.85. In addition, there were furnished for official use by this and other departments and agencies 18,234 copies of such items.

Three hundred forty-eight letters were written in connection with pending and proposed suits, applications of agents or attorneys for admission to practice before the Department, and charges preferred against United States commissioners, registers, attorneys and others.

Twenty-eight civil suits were recommended to cancel leases for oil and gas, coal, potash, borax, and sodium, to cancel patents issued through fraud, and to recover damages for loss of property in connection with timber trespass. Judgment was asked for the amount of money due. Twenty-four cases were reported as won and two lost. As a result of the suits, judgments and compromises have been reported amounting to \$174,240.

Applications of attorneys and agents for admission to practice before this Department amounted to 29, of which number 25 received favorable recommendation while 4 were suspended for further evidence.

There were decided on principles of equity and referred to the Board of Equitable Adjudication and confirmed 1,268 homestead entries of public lands, 55 homestead entries of revested and reconveyed lands in Oregon, 36 homestead entries of ceded Indian lands, 23 reclamation homesteads, and 60 desert-land entries.

The number of letters and reports received for consideration or answer from all sources during the year was 151,376 and 72,209 letters and decisions were written. The latter figure does not include letters prepared for signature in the Department.

Reports were submitted on 82 Senate and House bills, and necessary orders and instructions have been prepared or are in course of preparation in connection with bills, public and private, affecting the public lands, which were enacted into law. Reports were made on 38 enrolled bills.

The regulations of the General Land Office "of general applicability and legal effect" on June 1, 1938, were codified for inclusion in the Code of Federal Regulations. When this compilation is made available in printed form, it will be the first time in the history of the General Land Office that all of its principal regulations have been

brought together in up-to-date form and made available for general use.

On June 30, 1938, there were 310 permanent employees of the General Land Office in Washington, 71 in the district land offices, 164 in the field surveying service and 2 in the Chippewa logging service.

HOMESTEAD ENTRIES

Actions were taken in homestead cases as follows: On second-entry applications, 97; on applications to amend, 72; on applications for leaves of absence and for extensions of time to establish residence, 861; and on original entries, 4,686. There were patented 4,125 final and commuted homestead entries.

PUBLIC SALE AND TIMBER AND STONE APPLICATIONS

Four hundred fifty-four actions were taken on public sale applications, 98 of which were patented; and 26 actions were taken on timber and stone applications, 2 of which were patented.

FILING OF PLATS OF SURVEY

Instructions were issued for the filing of 180 plats of survey for lands in States in which there are district land offices. Thirty plats were directly filed by this Office in connection with which 9 public notices were prepared, for lands in States in which there are no district land offices.

MISCELLANEOUS APPEALS IN EX-PARTE CASES

Appeals in ex-parte cases involving applications and entries under the homestead, timber and stone and isolated tract laws, were considered in 5,953 cases.

NATIONAL FOREST HOMESTEAD LANDS

Nine thousand four acres in national forests which had been listed for homestead entry under the act of June 11, 1906 (34 Stat. 233), were returned to national forests by revocation of the listing orders and 194 acres were restored to homestead entry under said act.

CONTESTS OTHER THAN MINERAL CONTESTS

Six hundred fifty-five contests, including both Government and private, were considered. Approximately 78 hearings were held in Government cases. Appeals in these proceedings were considered in 39 cases. At the close of the year about 16 contest cases were pending

MINERAL LEASES AND MINING CLAIMS

Oil and gas leases and permits.—At the beginning of the year there were outstanding 1,020 leases embracing 405,671.72 acres. Fifty-two leases were issued based upon discoveries for 47,109.80 acres; leases for 3,328.65 acres in 9 producing oil and gas fields were sold, on which the bonus was \$175,852.38; 107 noncompetitive leases under the act of August 21, 1935, issued for 125,105.41 acres, leaving outstanding at the end of the year 1,177 leases embracing 576,927.22 acres. On July 1, 1937, 8,068 prospecting permits embraced 11,463,027.60 acres. One hundred sixty permits were issued and one reinstated, increasing the area under permit by 235,400 acres. One hundred four permits were canceled and 755 were terminated by law, decreasing the area under permit by 476,806.60 acres, and leaving outstanding 7,370 permits embracing 11,221,621 acres.

Coal, potash, sodium, phosphate, and sulphur permits and leases, and coal and phosphate licenses.—On July 1, 1937, there were 371 coal leases, embracing 70,562.83 acres; 30, embracing 4,872.99 acres, were issued; and 27, embracing 3,737.38 acres, were canceled, leaving 374 leases covering 71,698.44 acres. On the date named 198 coal permits embraced 144,063.83 acres, 28 permits, covering 18,799.88 acres, were issued; 24 were canceled and 42 expired by limitation; area, 35,937.58, leaving 160 permits embracing 126,926.13 acres. On July 1, 1937, 88 coal licenses embraced 3,484.25 acres; 16, involving 563.75 acres, were issued; 1 was canceled and 11 expired; the area combined 448.75 acres, leaving 92 licenses embracing 3,599.25 acres. No potash or phosphate leases were issued, but one phosphate lease was amended by the addition of 80 acres. On July 1, 1938, there were outstanding 11 potash leases for 27,785.49 acres; 28 potash permits for 62,548.87 acres; and 7 phosphate leases embracing 3,352 acres. During the year 9 sulphur permits for 5,985.01 acres were issued, bringing the total to 27 permits covering 17,508.01 acres. Twenty-two sodium permits, embracing 36,227.38 acres, were issued during the fiscal year, making in all 47 sodium permits for 65,586.36 acres.

Mineral applications and entries.—Ninety-three applications were disposed of and 53 entries, embracing 2,839.38 acres, were patented. Ninety mineral applications for 12,042.83 acres and 200 mineral entries for approximately 14,918.97 acres were pending at the end of the year.

Mineral contests.—Eighty-seven mineral contests were disposed of, leaving 44 pending decision at the expiration of the year.

RIGHTS-OF-WAY

Three hundred and twenty-eight right-of-way applications were approved and 41 stock-watering reservoir applications were disposed

of. In addition, 49 right-of-way applications were rejected, and 114 other actions were taken.

FEDERAL RECLAMATION PROJECTS

There are 49 Federal reclamation projects in 14 Western States, 22 of which are operated in whole or in part by the water users. There are, in addition, five Indian reclamation projects, the irrigation features of which are under the supervision of the Office of Indian Affairs.

Four hundred and ninety-six original reclamation homestead entries and 127 assignments of such entries were received; and 231 reclamation entries were patented.

DESERT LAND ACT

One hundred and two entries were patented under the Desert Land Act.

CAREY ACT

Carey Act segregations amounting to 76,299.84 acres were considered, on which either final or interlocutory action was taken.

PITTMAN ACT

Thirty-eight cases were received under the Pittman Acts of October 22, 1919 (41 Stat. 293), and September 22, 1922 (42 Stat. 1012). Action has been taken in all but 20 cases.

SWAMP AND OVERFLOWED LANDS

Under the swamp land acts, there were approved and patented to the States 1,628.74 acres, and claims for 353.61 acres were finally rejected. New claims were asserted for 1,017.87 acres.

STATE GRANTS AND SELECTIONS

New indemnity school-land selections embracing 2,577.35 acres were received, and selections amounting to 130,595.65 acres were approved and title conveyed to the States. Such selections involving 7,820.48 acres were canceled. Pending selections under quantity grants to States, for specific purposes, embracing 80,781.36 acres, were approved and title conveyed to the States.

Applications for patents for granted school sections under the provisions of the act of June 21, 1934 (48 Stat. 1185), were approved for patent during the latter part of the year, amounting to 208,798.24 acres, for which patents had not issued on June 30, 1938. Such applications pending at the end of the year embrace 1,598,024.23 acres.

New applications by the various States, under the Taylor Grazing Act, for exchanges of lands were received, embracing 266,067.44 acres. Selections involving 79,957.26 acres were approved, and

patents were issued in 24 cases embracing 50,377.16 acres. The rejected and relinquished applications involved 123,260.19 acres.

RAILROAD GRANTS AND SELECTIONS

Four new railroad selections were received, embracing 7,556.66 acres, and 3,302.02 acres were certified or patented in lieu of such grants.

ABANDONED MILITARY RESERVATIONS

Sales aggregating \$781.50 were made of lands and improvements in abandoned military reservations which have been transferred to this Department for disposal. Ten patents embracing 356.48 acres were issued on homesteads of such lands while one patent was issued where the lands were sold.

ALASKA

On June 30, 1938, there were outstanding 32 leases for fur farming covering approximately 170,260 acres. Matters relating to fur farm leases were considered in 164 instances. Three renewal leases were issued; two new leases were issued; and two leases were canceled.

On June 30, 1938, there were 13 grazing leases in effect embracing approximately 899,312 acres. Matters relating thereto were considered in 43 instances.

AVIATION LEASES

On June 30, 1938, there were outstanding 32 leases for aviation covering 14,691.94 acres. One application for lease was rejected and three such applications were pending.

COLOR OF TITLE

Nineteen applications for the sale of improved or cultivated public lands held under color of title for more than 20 years were approved and patented. The sum of \$3,431.18 was received from such sales. Two hundred and sixteen actions were required in cases involving color of title matters.

EXCHANGES

Various acts of Congress provide for exchanges of lands in order to effect consolidations of Government or private holdings or for other specific purposes.

Twenty-one patents were issued in forest-exchange cases and title was accepted to 183,892.47 acres of land for inclusion in national forests. The Secretary of Agriculture was notified in 58 cases that timber permits might issue to the exchange applicants.

Exchanges for the consolidation or extension of Indian reservations resulted in the addition of 3,637.58 acres to such reservations.

At the close of the fiscal year, there were pending under section 8 of the Taylor Grazing Act, 140 applications for exchanges involving 277,043.37 acres of public land and 285,431.71 acres of privately owned land. Most of these cases were awaiting reports from the field. Three cases were pending in the Department on appeal, and six cases were awaiting action in this office. Sixteen cases were rejected and one exchange was consummated.

GRAZING LEASES

Two thousand five hundred and thirty-eight offers of term grazing leases were made under section 15 of the Taylor Grazing Act, involving 3,967,126.16 acres, with an annual rental of \$94,221.02. One thousand four hundred and fifteen leases were issued embracing 1,836,593 acres, with an annual rental of \$45,896.81. At the close of the fiscal year, 3,628 applications for leases were pending, a majority of which were awaiting reports from the Division of Investigations. Three hundred and fifty applications and petitions for renewal were denied because the lands involved were not subject to lease.

INDIAN LANDS AND CLAIMS

Two contracts involving the sale of pine timber on ceded Chippewa Indian lands in Minnesota were virtually completed during the year and the sum of \$9,241.03 was credited to the "Chippewa in Minnesota" fund for the benefit of the Chippewa Indians.

Entries and sales of ceded Indian lands were considered in 720 instances. Sixty-seven patents issued on homesteads and two patents issued on sales. The sum of \$15,045.38 was received from the disposition of 6,083.14 acres of ceded Indian lands.

The matter of fee and trust patents on Indian allotments was considered in 800 instances and 66 fee patents embracing 8,186.40 acres and 259 trust patents involving 40,070.01 acres were issued.

Nine hundred and ten patents embracing 5,173.22 acres were issued on non-Indian claims within confirmed Indian pueblos in New Mexico.

PRIVATE LAND CLAIMS

Private land claims which were recognized or confirmed by many acts of Congress in the early history of the Government were considered in 152 instances and 22 patents for such claims issued embracing 7,933.77 acres.

TIMBER

Sales of dead, down, or damaged timber were considered in 80 instances. The sum of \$463.74 was received from such sales. Free use timber permits received special consideration in this office in 14 instances.

TOWN LOTS AND TOWNSITES

Town lot matters were considered in 220 instances and 160 patents were issued for town lots from which the sum of \$21,067.50 was received. Matters involving entire townsites were considered in six instances. Two patents were issued for townsites.

TRESPASS

Timber trespass cases required 431 actions and the sum of \$12,674.12 was accepted in settlement; coal trespass cases were considered in 165 instances and the sum of \$435.75 was accepted in settlement. Other actions included three for grazing, eight for gravel, and one for turpentine.

MISCELLANEOUS CASES

Actions were taken and patents issued as follows: Arkansas drainage, 48, with 4 patents issuing; bounty land warrants, 22, with 3 patents issuing; cash and credit, 45, with 27 patents issuing; preemptions, 13, with 4 patents issuing; quitclaim deeds, 14, with 10 quitclaims issuing; riparian rights, 18, with 2 patents issuing; scrip, 13, with 5 patents issuing; small holding claims, 31, with 10 patents issuing; soldiers' additional, 363, with 7 patents issuing; and special acts, 3, with 2 patents issuing. One claim for relief in connection with Mud Lake, Minn., was approved for payment.

TRACT BOOK NOTATIONS

More than 100,000 notations were made on the tract books. This includes 13,858 homestead applications and other miscellaneous cases, 5,328 grazing applications, 4,723 final and cash certificates, 2,878 oil and gas lease applications, 151 coal lease applications, 409 original entries, and 199 plats.

Withdrawals and classifications.—Six hundred and sixty-one Executive and other orders were noted. These include withdrawals for stock driveways, national forests, restored lists, power-site reserves and classifications, grazing districts, and mineral and other classifications and revocations thereof.

Relinquishments.—Entries numbering 545 were relinquished and noted.

Status cases.—Status was furnished in 20,082 cases.

Township diagrams.—Diagrams showing disposals and status, in 854 townships and fractional townships, were made for this and other bureaus.

WITHDRAWALS AND RESTORATIONS

The area of existing power-site reserves was decreased by 2,838 acres, that of the public water reserves was increased by 1,030 acres, and the lands classified as valuable for hydroelectric power purposes

were increased by 83,969 acres. Tracts aggregating 1,270 acres were restored from power-site designations under the Arizona and New Mexico Enabling Act and the Oregon and California Railroad Co. Revestment Act, while the areas in reclamation projects under the act of June 17, 1902, were decreased by 429,620 acres.

The Olympic National Park was created in Washington, the Isle Royale National Park was established in Michigan, and the Hot Springs National Park in Arkansas was enlarged, involving the reservation of 755,362 acres. Three new national monuments were created, four were enlarged and two were abolished, the net decrease being 249,006 acres. The area of the national forests was increased by 339,931 acres. Twelve new wildlife refuges were established, six were enlarged and one was reduced, resulting in a net increase of 398,264 acres. Withdrawals amounting to 7,754 acres were made for air navigation sites for the Department of Commerce, while 521 acres were released from former withdrawals for such use. Three tracts of public land were sold under the recreation law to the States of Oregon and Oklahoma and to the town of Sampson, Wis., one recreational petition was denied, one lease issued, and 1,435 acres were released from recreational withdrawals. Eight stock driveways were enlarged, 4 were revoked and 18 were reduced, resulting in a net decrease of 353,792 acres.

Withdrawals aggregating 252,258 acres were made for use by the Farm Security Administration, successor of the Resettlement Administration, and 3,187 acres purchased by the latter were transferred by Executive order from the jurisdiction of the Department of Agriculture to the jurisdiction of this Department. Withdrawals for lighthouse purposes were reduced by 1,120 acres, a withdrawal of 40 acres for use by the War Department as an airplane site was revoked, and one for the use of an Indian tribe expired by limitation.

MINERAL WITHDRAWALS AND CLASSIFICATIONS

A summary of the outstanding mineral withdrawals and classifications as of June 30, 1938, is as follows:

	Withdrawn	Classified
Coal.....	26, 971, 813	33, 276, 103
Oil.....	5, 168, 593	71, 884
Oil shale.....	5, 989, 949	4, 081, 208
Phosphate.....	1, 889, 601	302, 219
Potash.....	9, 411, 906	-----
Total.....	49, 431, 862	37, 731, 414

The area of the withdrawn oil land, shown above, includes 13,578 acres withdrawn as a helium reserve. The figures given include much land which has been patented with or without a reservation of min-

erals. The areas so patented have not been computed. However, some or all minerals have been reserved in patents aggregating 43,645,798 acres issued under the stock-raising and other laws, for lands not withdrawn or classified as valuable for minerals, as well as for lands so withdrawn or classified.

Tables showing in condensed form some of the activities and accomplishments of the General Land Office during the fiscal year are as follows:

Mineral Leases, Permits, and Licenses Outstanding on June 30, 1938

Class	Leases		Permits		Licenses	
	Number	Acres	Number	Acres	Number	Acres
Oil and gas.....	1,070	451,821	7,370	11,221,621	-----	-----
Oil and gas, act Aug. 21, 1935.....	168	184,008	-----	-----	-----	-----
Coal.....	374	71,688	160	126,926	92	3,599
Potash.....	10	25,505	23	54,696	-----	-----
Phosphate.....	7	3,352	-----	-----	-----	-----
Sodium.....	2	801	47	65,586	-----	-----
Sulphur.....	-----	-----	27	17,508	-----	-----
Total.....	1,631	737,175	7,627	11,486,337	92	3,599

Summary of Areas on Outstanding Mineral Leases, Permits, and Licenses, as of June 30, 1938

	Number	Acres
Leases.....	1,631	737,175
Permits.....	7,627	11,486,337
Licenses.....	92	3,599
Total.....	9,350	12,227,111

Leases Other Than Mineral, Outstanding on June 30, 1938

Class	Number	Acres
Term grazing leases under Taylor Grazing Act ¹	1,415	1,836,593
Temporary leases under Taylor Grazing Act.....	187	665,000
Grazing leases, Alaska.....	13	899,312
Fur farm leases, Alaska.....	32	170,260
Aviation leases.....	32	14,692
Leases for mineral and medicinal springs.....	1	40
Leases for water wells.....	2	80
Total.....	1,682	3,585,977

¹ In addition, there were outstanding on June 30, 1938, 1,123 offers of term grazing leases covering 2,130,533 acres.

Original Entries

	Public land		Indian land	
	Number	Acres	Number	Acres
Homesteads:				
Stockraising.....	101	41,383	5	1,695
Enlarged.....	19	4,239	1	268
Reclamation.....	158	15,056	4	700
Forest.....	6	611		
Section 2289 et al.....	163	17,172	7	786
Total homesteads.....	447	78,461	17	3,449
Deserts.....	4	696		
State selections.....	5	2,646		
Railroad selections.....	3	546		
Applications and filings.....	183			
Miscellaneous.....	84	45,145	6	
Total.....	726	127,494	23	3,449
Indian land as above.....	23	3,449		
Grand total.....	749	130,943		

Final Entries

	Public land		Indian land	
	Number	Acres	Number	Acres
Homesteads:				
Stockraising.....	2,497	1,174,702	93	40,025
Enlarged.....	265	72,167	35	6,274
Reclamation.....	188	18,716	31	2,884
Forest.....	29	2,945		
Commutated.....	12	823	19	1,652
Section 2289 et al.....	961	93,413	40	3,797
Total homesteads.....	3,952	1,362,766	218	54,632
Deserts.....	102	12,125	5	759
Public auction.....	147	15,452	1	40
Timber and stone.....	2	120		
Mineral.....	134	10,586	2	499
Miscellaneous.....	368	21,005	40	200
Total.....	4,705	1,422,054	266	56,130
Indian land as above.....	266	56,130		
Grand total.....	4,971	1,478,184		

Patents and Certificates

	Number	Acres
Homesteads:		
Stockraising.....	2,670	1,328,072
Enlarged.....	356	91,367
Reclamation.....	245	23,371
Forest.....	52	5,074
Section 2289, et al.....	1,057	105,188
Total homesteads.....	4,380	1,553,072
Deserts.....	113	14,356
Public auction.....	98	9,866
Timber and stone.....	2	89
Mineral.....	53	2,839
Railroad.....	7	2,957
Special acts.....	994	1,819,342
Miscellaneous.....	1,168	84,926
Total patents.....	6,815	2,487,447
Certified to States.....		137,425
Grand total.....	6,815	2,624,872

¹ Includes 672,650 acres of school section land, patented to the State of Iowa under the act of June 21, 1934 (48 Stat. 1185).

LANDS PATENTED WITH MINERAL RESERVATIONS

The following table shows the areas patented during the year and the total areas heretofore patented in which minerals in some form have been reserved to the United States.

Classes of patents	Fiscal year	Total
	<i>Acres</i>	<i>Acres</i>
Stockraising Act, all minerals reserved.....	1, 328, 072	30, 441, 344
Other acts:		
All minerals reserved.....	162, 300	606, 492
Coal only reserved.....	26, 534	10, 812, 002
Some named minerals reserved.....	27, 574	1, 785, 960
Total.....	1, 544, 480	43, 645, 798

DIVISION OF GRAZING

F. R. Carpenter, *Director*

AT THE END of the fiscal year, the Division of Grazing had completed approximately $3\frac{1}{2}$ years of operations as the administrative unit in charge of grazing districts established under the Taylor Grazing Act of 1934. Activities concerning the regulation of range use were continued as formerly under the system of issuing temporary, 1-year grazing licenses, pending the accumulation of data sufficient to warrant the issuance of term permits as prescribed in the act.

This year, these annual licenses will be replaced by term permits of not more than 10 years' duration, in 1 grazing district in each of the 10 States affected, namely, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming.

In order to take care of the existing livestock industry pending the issuance of term permits, grazing licenses were issued to 18,752 stockmen owning 9,050,771 head of livestock in 48 grazing districts during the year. In addition, under a cooperative grazing association plan in Montana Grazing District No. 1, a district in which the amount of Federal range is comparatively small, 10 associations grazed approximately 150,000 livestock on lands of all ownerships in that district.

Twelve grazing districts established in late 1937 in Idaho, Montana, Oregon, Wyoming, and Nevada, were placed under regulations for the first time in 1938. The amount of Federal range involved in these 12 districts was 30,086,579 acres; the increase in licenses resulting from the addition of these districts was 3,685, and the increase in the number of livestock using grazing districts under regulation was 3,476,148.

The endeavors of administration have been geared so that rules promulgated and their application would recognize and promote the preservation of the soil and forage resources, the improvement and development of the range, and its orderly use in promoting the stability of the livestock industry.

Whereas the first year and one-half of the Division of Grazing's activities were occupied mainly in acquainting the public and the Federal officials with the law and its objectives, building an adminis-

trative and technical force, and charting the course leading to sound land management, the next 2 years were devoted largely to enlarging and refining the general program.

The fiscal year 1938 may be considered a year of definite accomplishment in which the tools used were given a cutting edge. With a view to solving the many questions attendant upon the issuance of term permits, specific studies in grazing districts were necessary. The control of grazing and the regulated use of the range brought together a harmony of purpose among the users and the administration with gratifying results in the program of conservation and the stabilization of the range-livestock industry.

The fourth year of administration witnessed refinements and further accomplishments in the program of wildlife conservation on the public ranges. In many districts the Division of Grazing made a reasonably accurate estimate of the numbers and species of big game animals using the range during part or all of the year. Cooperation with Federal and State agencies and sportsmen's associations afforded the means of redistribution of big game from congested areas to less congested areas suitable to their habitat. A considerable part of the improvements made on public ranges and many of the control measures instituted during the year were in the interest of big game animals and birds.

Cooperative arrangements with other Federal agencies, State associations, stockmen groups, and game associations continued to feature the conservation program which the Taylor Grazing Act is designed to foster.

The interrelation of private and public lands was responsible for the clause of section 3 of the act which directs that preference in grazing privileges shall go to those who have land and water dependent upon the public land for their proper use. Now after 4 years of administration of this act, its meaning and outcome can be interpreted with a fair degree of certainty. The resources and conditions in all of the 49 grazing districts have been appraised. In some districts the appraisals have been necessarily superficial owing to pressure for specific information and immediate administrative needs. However, the studies were sufficient in scope to afford action that would promote the proper use of the range and the interrelated private properties.

Other districts have been intensely studied and allotted to some individual, group of individuals, or community in such a way as to augment the use of their private land and water under restrictions which safeguard the sustained yield of grass. Ample provision has been made for the welfare of a sustained population of a reasonable number of game animals and upland birds in all districts.

The entire public range is being surveyed and classified for its proper use and rehabilitation, and more than 20,000 private properties dependent thereon are likewise being appraised. The method of obtaining information and receiving recommendations from local advisory boards has continued to demonstrate the merit of this system of operating this vital resource. There were 665 locally elected district advisers in the 49 grazing districts. These men are all practical stockmen who live and operate on the public range. In some districts, such as those in New Mexico, a wildlife representative has been appointed to membership on each board.

Many of the accomplishments during the year were the realization of plans that were outlined during the preceding year. The comprehensive range survey and report covering New Mexico Grazing District No. 5 was completed at the close of the preceding fiscal year. The material was used as a guide to devise standards of measurement and rules to govern the adjudication of range privileges in the Southwestern States where water is prime base property. During the year, a similar study of Colorado Grazing District No. 6 was completed and used as a basis for adjudication of range privileges in the Northwestern States where feed is a necessary requisite to a yearlong livestock operation and land is considered prime base property.

Using the data obtained from the range-surveys studies of these two districts, the Director of Grazing began at the outset of the fiscal year to prepare a code for the adjudication and the future management of the Federal range.

Cooperative agreements with other Federal agencies that were arranged during 1937 were continued during 1938. Under the western range-survey cooperative agreement, field work in 17 counties in the Western States was completed and the reports reviewed and made available to all cooperative agencies.

The cooperative range study in northeastern Nevada, involving the Bureau of Agricultural Economics, the Division of Grazing, and other agencies interested, was continued through the fiscal year. The area studied includes all of Nevada grazing district No. 1, mainly in Elko County, and is one of the outstanding examples of cooperative effort on the part of State and Federal agencies that has been so far undertaken. The study affords an opportunity for the cooperative agencies to work out principles and methods of public and private range-land management that will apply, perhaps with some modification to meet local conditions, to large parts of the West. The Division of Grazing anticipates issuing term permits in lieu of the present temporary licenses in Nevada grazing district No. 1 within the next year. The issuance of these permits will mark a most important stage in the history of range management in this and adjoining areas.

ORGANIZATION

The administrative set-up of the Division of Grazing consists of a Washington headquarters staff, including the Director, the Assistant Director, Administrative Assistant, two experts on land law, one expert on land classification, one expert on the technical phases of land use, and the necessary clerks; a field staff with headquarters at Salt Lake City, Utah, which is composed of a deputy director, a chief of range management, a chief of range improvements, a chief of range surveys, and a chief hearings examiner. Nine regional graziers, one for each State except California, 33 district graziers, 22 range examiners, and the necessary clerks complete the field organization. The total regular personnel is 128.

In addition to the regular staff there are 665 district advisers who are elected by popular vote within the district they represent and appointed to serve at the call of the regional grazer in a recommendatory capacity.

These advisory boards of the Division of Grazing have been of inestimable value in the formulation of the Federal Range Code and, in furnishing an abundance of needed information to the administrative authorities, have been responsible for much of the progress and accomplishments.

STATUS OF GRAZING DISTRICTS

The 252,763,500-acre area embraced within the 49 grazing districts under regulation during the year naturally involves many different types of ownership. For the most part, the State and private grazing lands interspersed therein with public lands are similar to them and are leased and owned by livestock operators. In addition to the 112,823,338 acres of vacant, unappropriated, unreserved lands affected by the withdrawal of November 26, 1934, there are more than 10,000,000 acres of prior withdrawals within grazing districts, most of which, by agreement, are under temporary administration of the Division of Grazing. Lands in this category include stock driveways, power site reserves, military reserves, naval oil shale reserves, public water reserves, and reclamation withdrawals.

THE FEDERAL RANGE CODE

The experiences of the Division in the regulation and management of the public range in grazing districts during the first 3 years of administration forcibly crystallized a common view among stockmen and Federal officials that a Federal Range Code broad enough for proper action on all manner of cases was needed. Specific data from two widely divergent grazing districts were used as a guide to formulate new rules that would cover nearly all conditions expected to be encountered.

Consideration revolved around the methods of establishing a suitable legal yardstick under which the necessary reduction of use on the overcrowded public range could be made. Two weapons that can be exactly measured furnished the foundation of the yardstick, (1) commensurability and (2) priority.

COMMENSURABILITY

When the Taylor Grazing Act was passed in 1934, the range was infested with what were known as nomadic sheepmen. These men ordinarily owned or leased little or no real estate but trailed and grazed their flocks over public lands, and their operations often put the established land-owning ranchmen out of business by stripping the range of forage. Section 3 of the Taylor Grazing Act said that preference in permits should go for "the proper use of lands and waters owned, occupied, and leased" by certain parties.

The natural deduction from the existing state of facts and a reading of the law was that control of land or water was to be a prerequisite for a preference right on the range, and the amount of an applicant's land or water would be the yardstick for measuring the extent of such use. This principle was early accepted in meetings in the Western States and was never seriously disputed anywhere.

PRIORITY

After the matter of commensurability was established, it was apparent that a rule would be required to limit such parties to those who were established in the range livestock business, if any degree of stabilization was to be attained. From this need came the so-called priority rule. After many trial rules, hundreds of meetings and discussions, and years of experimenting, a compromise has been reached on a priority rule which is accepted as sound. It is set forth in the Federal Range Code under the definition of "land dependent by use" and is as follows:

Land dependent by use means forage land which was used in livestock operations in connection with the same part of the public domain, which part is now Federal range, for any 3 years or for any 2 consecutive years in the 5-year period immediately preceding June 28, 1934, and which is offered as base property in an application for a grazing license or a permit filed before June 28, 1938. Land will be considered dependent by use only to the extent of that part of it necessary to maintain the average number of livestock grazed on the public domain in connection with it for any 3 years or for any 2 consecutive years, whichever is the more favorable to the applicant, during the 5-year period immediately preceding June 28, 1934.

RANGE SURVEYS

The primary function of the range-surveys organization is to obtain the necessary factual data to form a basis for administrative action in the granting of range privileges and the management of the public

range. This work involves: (1) The gathering, analyzing, selection, and presentation of pertinent material already existing which concerns the public-range area to be studied; (2) securing historical data on past and present livestock use of the area; (3) determination of the extent, character, proper season of use, forage-producing capacity, and suitable rate of stocking of the public range; (4) determination of the qualifications of livestock operators who use or desire to use the public range through the examination and rating of the base properties, both land and water, owned or controlled by those claiming dependence on the use of the public range; (5) furnishing such accumulated information to the administrative force as fast as it becomes available in order to form a factual basis for administrative action in the selection of those entitled to share in the use of the range; and (6) development of essential data and preparation of maps to be used in range-management plans and correlation of proper land-use principles involving all types of ownership.

There are approximately 12,500 townships, each containing 36 square miles of land within the boundaries of the 49 grazing districts in operation during the year. Status and base maps have been designed on a scale of 1 inch to the mile assembled into sheets containing 32 townships, each sheet being 4 townships wide and 8 townships long. Each of the 10 Western States is divided into map areas corresponding to the 32-township sheets and each sheet given an identifying number. Key maps for office reference, as a means of identifying the number system, are prepared on a similar scale. Five hundred and twenty-nine of these base maps of the 32-township size are required to cover the territory embraced in the 49 grazing districts.

At the end of the fiscal year, 2,345 of the 12,426 townships in grazing districts had been surveyed; status had been completed in 2,893 of the 13,154 master township plats involved; 158 of the 529 status maps had been prepared; 243 of the 529 base maps were drafted; and 9,337 of the 31,083 dependent properties had been appraised.

The principal efforts of the range-survey organization since January 1, 1938, have been devoted to the task of assembling all necessary factual data covering one district in each of the 10 States in an effort to have these districts on a permit basis by January 1, 1939.

LAND CLASSIFICATION

The classification of lands with respect to their value for agricultural purposes as required by the various land laws is a duty of the Division of Grazing. This classification involves all lands located within or without the boundaries of grazing districts which are applied for under applicable land laws in accordance with section 7 of the Taylor Grazing Act as amended June 26, 1936.

It is also the duty of the Division to determine the propriety of applications under sections, 8, 14, and 15 of the Taylor Grazing Act from the standpoint of public benefit where the lands involved are located within grazing districts.

The recommendations for designations of lands applied for under the enlarged and stock-raising homestead acts and determination of the value of watering places for public purposes, together with the preparation of appropriate orders, are other functions of the Division of Grazing. The designations under the enlarged and stock-raising homestead acts are made principally for the purpose of permitting the adjudication of homestead entries having valid claims established prior to the Executive orders of November 26, 1934, and February 5, 1935, withdrawing public lands for classification.

At the beginning of the present fiscal year, there were 612 cases pending under sections 7, 8, 14, and 15. During the year, 889 cases were received, making a total of 1,501 cases to be acted upon. Of this number, 804 were acted upon, leaving 697 cases pending at the end of the fiscal year. Ninety-nine cases under the enlarged and stock-raising homestead acts were acted upon, and on June 30 there were 31 cases pending action by the Division; 1,520 acres were designated under the enlarged homestead act in 7 States, increasing the total acreage so designated to 268,471,745 acres; 3,000 acres of land were designated under the stock-raising homestead act in 11 States, increasing the outstanding area to 102,443,062. During the fiscal year, 840 acres in 6 States were included in water reserves, and 980 acres in 6 States were excluded from such reserves, decreasing the gross public water reserve area in 12 States to 511,383.

RANGE IMPROVEMENTS

The range improvement program of the Division was consolidated and put into effect during the fiscal year 1938. This consolidation has already demonstrated its value in promoting efficiency of administration, supervision, and planning of the work program and has proved to be a valuable step in further decentralizing the C. C. C. unit.

Funds made available for range improvements under sections 10 and 11 of the Taylor Grazing Act are expended with the greatest possible benefit due to this consolidation because the range-improvement activities are thus dovetailed, and, by use of coordinated planning, a large proportion of the money made available under these sections is usable for the purchase of equipment and supplies to be used directly in the districts in which the grazing fees are paid.

PERMITS TO CONSTRUCT IMPROVEMENTS

Under section 4 of the act, the Secretary is authorized to issue permits to construct fences, wells, reservoirs, and other improvements on the public lands necessary in the care and management of permitted livestock.

Fences are the principal improvements constructed under the provisions of section 4, and in States where range allotments are advanced, as in Arizona and New Mexico, the majority of permits of this nature were issued. Approximately 760 miles of fences were constructed by 137 applicants during the year. Also, 56 permits were issued to construct miscellaneous improvements, such as installing water troughs, cutting corrals, small reservoirs, wells, and trail gates.

CIVILIAN CONSERVATION CORPS

The purpose of the Civilian Conservation Corps activities of the Division of Grazing is to rehabilitate the public domain and to convert thousands of acres of formerly unused range into good grazing land for livestock. During the fiscal year 1938 there were 45 camps assigned to the Division, 21 of which were located in the Salt Lake City, Utah, region and 12 each in the Albuquerque, N. Mex., and Reno, Nev., regions. The enrollees of these camps are supervised by the Army when in camp and by the Division of Grazing, C. C. C., when engaged in the construction of improvements on the public land.

The work projects of the 45 C. C. C. camps being operated under the jurisdiction of the Division in the 9 Western States of Arizona, California, Colorado, Nevada, New Mexico, Idaho, Oregon, Utah, and Wyoming are those recommended by the advisory boards of the grazing districts and approved by the regional grazier of the region in which the camps operated. In each case the projects are planned to relieve the most acute need of the area, whether it be water development, fence construction, definition of stock boundaries, rodent control, or some other work of vital importance to proper range management. While the work accomplished has in each case proved of immediate benefit, construction was planned, for future benefits as well, with the object not only of relieving present range conditions but also of providing future means of conservation and protection of the 110,000,000 acres of range land administered by the Division.

Water is the prime requisite of the public domain. Sections of the Federal range used partially or not at all in past years are being made available for grazing purposes largely through conservation and distribution of water. Dams have been built to impound the water from mountain streams and to preserve the early run-off, and check dams have been built in dry creeks for the purpose of arresting soil

erosion and moderating run-off for impounding downstream. The development of springs where feasible has been accomplished, and in many cases wells have been drilled in an endeavor to provide reliable watering places on vast dry areas in order that the range may be more properly and seasonably serviced and thus afford a better distribution of use. In connection with this water development, storage facilities such as troughs and tanks have been constructed, not only conserving the water but also providing much better watering facilities.

Closely allied with the water program is the work of opening truck trails into the grazing regions and building stock trails for the movement of animals from winter to summer range or to market. This trail construction opens up large areas of grazing lands formerly more or less inaccessible and not only furnishes much needed new pasture but also aids in the elimination of overgrazing in other areas. The holding corrals constructed along these trails allow stock to be held overnight on the way to market and are of great advantage to stockmen. A sufficient water supply is included in the construction of each corral. Bridge and cattle-guard construction are important parts of these trails and are of great assistance in expediting the movement of cattle and reducing losses of livestock.

An extensive rodent-control program has proved of great value in the conservation of soil and forage resources. More than 1,401,378 acres have been treated for control of ground squirrels, gophers, prairie dogs, kangaroo rats, and jack rabbits. Eradication of poisonous weeds has proved very important in saving livestock, and 98,798 acres have been treated for infestations of poisonous larkspur, death camas, and other weeds which cause the death of hundreds of head of livestock.

The following table shows the accomplishments of the major work projects of the Division's Civilian Conservation Corps program for the fiscal year 1938:

Bridges.....	37
Fences (miles).....	477
Reservoirs.....	52
Springs.....	68
Wells—fully equipped.....	41
Cattle guards.....	62
Corrals.....	65
Truck trails (miles).....	1, 046
Stock trails (miles).....	264
Check dams:	
Permanent.....	125
Temporary.....	1, 919
Other flood-control structures.....	40
Acres treated for poisonous plant eradication (acres).....	98, 798
Acres treated for rodent eradication (acres).....	1, 401, 378
Impounding and diversion dams.....	166

Educational Program

The C. C. C. unit has been vigilant and aggressive in its education program in various camps. The chief objectives of the educational program are vocational, character, and citizenship development with specific consideration given to job training. The enrollees are given every opportunity to learn to operate the machinery used on the work projects, and, through the daily work in connection with classroom instruction, many skilled workers have been developed from completely untrained men. Systematic instruction on the job includes practice on the job in the field and at least 2 hours per week of systematic basic instruction underlying the work off the job. This basic instruction includes a general course in conservation. The effectiveness of the education and training on the job program of these C. C. C. camps may be judged from the fact that much of the difficult construction has been done under the supervision of foremen who were formerly enrollees. Already many of the enrollees have been advanced to special jobs in the C. C. C. of the Division and others will become valuable permanent employees.

COOPERATION

1. Local Associations of Stockmen

To remedy the situation of interspersed land ownership, where State, county, tax-default, and privately owned lands are checker-boarded and intermingled with public domain lands, the Department early realized the necessity for some coordinated plan of management, with a system of unified control for all these lands if economic and sane use were to be established. To make possible this form of administration, a general form of cooperative agreement to be used in entering into agreements with local associations of stockmen was approved by the Secretary. On March 14, 1938, the Department approved another form of cooperative agreement to be used by the Secretary in entering into agreements with local associations of live-stock men. This is known as the Oregon form of agreement to distinguish it from the form already in use referred to as the Montana form. The Oregon form is considered as being better adapted for use in areas where the acreage of the Federal range is in excess of the privately controlled land, which is just the opposite from the situation in Montana. In general, the Montana form provides for turning the public lands over to the associations for administration under general supervision of the Secretary, while in the Oregon form the association turns its lands over to the Secretary to be administered in the same manner as the public lands.

During the fiscal year ending June 30, 1938, the number of these cooperative agreements with local associations of stockmen was

increased by five, and two agreements were amended. There are five agreements and seven amendments pending. The total number of these agreements approved to date is 22.

2. Southern Pacific Land Company

The cooperative agreement with the Southern Pacific Land Company which became effective January 1, 1937, was extended for one year to December 31, 1938.

WILDLIFE

At the outset of the administration there was a realization that wildlife in the course of western conquest and expansion of the range-livestock business had through natural competition been deprived of its rightful share in the use of the public lands. Before establishing any grazing districts, the Secretary of the Interior explored all angles of the wildlife situation and its needs with respect to public land, and, after conferences with wildlife agencies and groups in Denver in February 1935, numerous conferences were arranged to discuss the subject. As a result of cooperation with State and Federal agencies in wildlife and sportmen's associations and of efforts on the part of the Division of Grazing, approximately 8,000,000 acres of public land within the boundaries of established grazing districts are now reserved for wildlife use. Three game ranges, aggregating in area more than 3,500,000 acres, have been set aside on the public land to be administered jointly by the Division of Grazing of this Department and the Biological Survey of the Department of Agriculture.

The idea underlying the arrangement to create game ranges with primary protection to wildlife and yet retain a part of the range for use by domestic livestock under regulation is believed to be a natural way of handling such a program. In all game ranges the public land is set aside for this joint use, but the prior right to the use of the land is given to a specified number of wildlife species.

Wildlife refuges are established for the sole purpose of propagating and protecting wildlife, and the jurisdiction is placed in the Department of Agriculture after the land has been withdrawn from other uses. Sixteen wildlife refuges have been created by Executive order, aggregating in area approximately 4,000,000 acres of public land.

The management of wildlife within grazing districts in New Mexico continued with amicable relations between the stockmen, the Division of Grazing, and the State Fish and Game Commission which fostered the principle that wildlife in New Mexico is entitled to share to a reasonable extent in the use of all the range jointly with livestock.

A plan has been initiated in Oregon, by the stockmen using public ranges, whereby in cooperation with Federal agencies harmonious relationship between owners of domestic livestock and agencies

responsible for wildlife may be promoted. Steps similar to the Oregon plan have been taken in all other public-domain States. Through the aid of the licensees within grazing districts, it is expected that a reasonably accurate census of all forms of wildlife will be available in the near future. An important phase of that census will bring to light reasonably safe estimates of the amount of public land needed to afford proper seasonal use by game animals in addition to that required for domestic livestock.

In Idaho, the Division of Grazing furnished some of its C. C. C. facilities and means for employing on a repayment basis a technical man from the Biological Survey who directed the transplanting of beaver from areas where they are unwelcome to public domain areas where they contributed an inestimable amount of valuable soil and stream-bed conservation. This activity had the benefit of three outstanding results: (1) Restoration of the beaver population; (2) arresting stream-bed erosion and the consequent loss of soil; and (3) increase of water supply and watering facilities.

ENFORCEMENT

Enforcement under the Rules for Administration of Grazing Districts as revised June 14, 1937, and the Federal Range Code has been maintained with satisfactory results. A large number of alleged trespasses have been investigated, trespass notices served, and trespasses abated. Many cases have been investigated for violation of the terms of licenses. Administrative officers of the Division, assisted by temporary range riders during concentrated seasonal livestock movements on the range, have been successful in promoting orderly migration of stock over designated routes. Enforcement has been and is mainly a matter of education and understanding. One of the principal accomplishments to be achieved is the prevention of a violation rather than the arresting of a violator after it has occurred, and, in this particular, results obtained were extremely satisfactory.

HEARINGS AND APPEALS

During the year 1938, 20,752 applications for grazing licenses were filed with the regional graziers. These applications were considered by the regional graziers, and action was taken in accordance with the provisions of the Rules for Administration of Grazing Districts and the Federal Range Code. That action taken was satisfactory in the great majority of cases is indicated by the fact that appeals were filed in only 420 cases which represents a very small percentage of the number of applications considered. A number of these appeals have been withdrawn or adjusted without formal hearings. Hearings have already been held before an examiner in a large number of cases, and

others are being set for hearing as rapidly as possible to the end that the grazing rights of the parties involved may be determined at an early date.

HIGHLIGHTS OF PROGRESS IN THE VARIOUS REGIONS

Many of the accomplishments that essentially require careful ground work and continued activity from year to year were realized in the various regions during the year. Some of the high lights of the accomplishments include the following:

Utah, Region 2

Funds returned to grazing districts out of grazing fees collected afforded the construction of 125 improvement projects on the public lands in the region.

Only 37 wilfull trespasses were committed, a gratifying record considering that the range in this region is used by approximately 5,000 licensees.

Complete appraisals of nearly 300 ranch set-ups, dependent on the use of the public range in one district, placed that district in a position to go on a term-permit basis in the near future. Inventory of properties and range carrying-capacity studies in other districts progressed at a satisfactory pace.

The range improvement program to cover the next 4 years of activity was designed during the year.

Nevada-California, Region 3

Satisfactory progress was made during the year in subdividing natural units of the 35-million-acre public-range area of this region into group and individual allotments.

About \$5,000 worth of equipment for water development was purchased from the 25 percent fund returned to the California districts. Moneys for improvement under this fund in Nevada were tied up in litigation. Materials included pipe, windmills, troughs, and fence wire. Installation and construction were performed by C. C. C. enrollees.

Difficulties of administration of "checkerboard" lands, located in alternate ownership by the United States and the Southern Pacific Land Company and occupying a 40-mile strip across northern Nevada, were greatly minimized by satisfactory allotment through continued cooperative arrangement and agreement among all concerned.

Oregon, Region 4

In executing an agreement entered into during the year between the Division of Grazing and the State land board and several counties,

stockmen of Oregon leased 1,000,000 acres of State and county land in grazing districts and turned it over to the Division of Grazing to administer.

About 500 unclaimed wild horses were removed from grazing districts after being rounded up on the range by aeroplane and disposed of in accordance with State law and rules of the range.

Three carloads of wire were purchased, 150 miles of stock driveway posted, 3 stock bridges built, 45 reservoirs and 40 springs were developed out of funds returned to grazing districts from fees collected.

Idaho, Region 5

A preliminary survey of wildlife that inhabit grazing districts in Idaho resulted in a census estimate of the following numbers and species of game and birds in the four Idaho districts: 10,000 deer, 1,500 elk, 800 mountain sheep, 700 mountain goats, 7,000 antelope, 400 moose, 15,000 sage chickens, and 8,000 grouse.

Two hundred dependent ranch set-ups were classified and rated. Cooperation with Federal and State agencies resulted in the construction of a 7-mile drift fence, posting of 50 miles of stock driveway, suppression of 11 major fires on public land, and the transplanting of 800 beavers from areas where they were short of food or where they were more or less a nuisance to small public-domain stream beds where already they have contributed an inestimable value to conservation of water and soil.

New Mexico, Region 7

Funds returned to grazing districts from fees collected afforded the purchase of poison mix for rodent extermination and material for cattle guards on important stock trails. Enrollees of C. C. C. camps furnished the labor, and the program was given enthusiastic support of stockmen. This is a real conservation activity. Certain rodent species in the Southwest are known to store 20 to 40 pounds of grass seed in each colony den.

Practically all licensees in the region are now operating on individual allotments. A total of 1,967 allotments have been set up with ample provision for the needs of Indians residing in grazing districts.

Colorado, Region 8

Grazing officials invited groups of stockmen affected to accompany them out on the range to subdivide equitably the districts into group and individual allotments. That satisfactory results were obtained through this "home rule" method is evidenced by the following: Colorado district No. 2 is broken down into 15 common-use and 111 individual allotments. Ninety percent of the users in Colorado districts Nos. 3 and 4 are operating in group and individual allotments.

Colorado district No. 6 has been subdivided into 9 common-use and 123 individual allotments. This allotment system which prevents the unnecessary movements of livestock in grazing districts is a tremendous advance in conservation.

Arizona, Region 9

The Division of Grazing, the Forest Service, and the Indian Office (three major land-management agencies in Arizona) have by agreement inaugurated a comprehensive system of fire prevention and control on public lands of the State.

Through cooperation with the Biological Survey, 74,820 acres of Federal range were treated for rodent extermination.

The 25 percent of fees collected furnished the means for constructing 8 stock corrals, 25 miles of fence, and 11 miles of stock driveway boundary.

The Arizona "strip" was agreeably subdivided for use into four individual and five community range allotments.

Complaints of serious trespass are rare in Arizona due to the allotment of definite range areas and the fact that proper use of the range is primarily dependent upon privately developed stock water which actually governs the area of range that can be used.

Wyoming, Region 10

Adherence to a suitable standard for measuring the amount of public range forage to which applicants with dependent property would be entitled resulted in the elimination of 50,000 sheep and 10,000 cattle from the public range. This apparent herculean task was accomplished without any of the affected stock growers requesting a hearing on his case.

Grazing districts were subdivided into administrative units and the land-ownership break-down in each unit was tabulated, which simplified the problem of livestock distribution and assisted in obtaining practical agreeable estimates of range carrying capacity, pending the accumulation of scientific data. In this practically new region, violations of the rules were exceptionally few, only six being reported.

DIRECTOR OF FORESTS

Lee Muck, Director

THE Office of Director of Forests of the Department of the Interior was established May 18, 1938, by Departmental Order No. 1283.

This office was created to promote a unified policy of forest conservation on all lands under the jurisdiction of the Department of the Interior. These lands and their forests involve a wider range and a greater variety of prudent use than those under the jurisdiction of any other agency of the Federal Government.

A brief list of characteristic forest lands under the jurisdiction of the Department of the Interior shows the complexities, and at the same time the necessity of a coordinated forest policy, involved in the conservation administration of these lands.

In the national parks the preservation of the primeval forests are the first consideration. Not only are the forests in the national parks preserved for their inspirational and recreational use by all of the people of the country, but they form a natural wildlife reservoir and laboratory of increasing importance to ecologists.

At the other extreme in prudent use the Department of the Interior is responsible for the businesslike management of forests on the revested and reconveyed grant lands of Oregon where timber cutting must be developed under principles of sustained yield management.

Among the new and larger forest responsibilities of the Department is the planning of the administrative organization, the field projects of and activities on the revested and reconveyed Federal forest land aggregating 2,213,988 acres located in 18 counties in western Oregon and locally called "O and C lands." This term, as used locally, means the revested Oregon and California Railroad and reconveyed Coos Bay Wagon Road grant lands. According to the Federal forest survey in 1934, the total timber volume on these lands was 46,235,923,000 board feet. Their economic and social importance, both locally and nationally, places them in the front rank of American forests.

In 1937 a new start was made to provide these lands with a sound progressive plan of administrative management, with emphasis on

the business aspects of forestry. The act of August 28, 1937, authorized and outlined a plan of sustained yield management for a specific Federal forest property for the first time in American forestry law. Moreover, this act authorized the Secretary of the Interior to make cooperative agreements with other Federal and State agencies and with private owners and operators for the coordinated administration of forest units on the revested and reconveyed lands in conjunction with other public forests and lands in private ownership, when such action will facilitate sustained yield management. Another section of the act authorizes similar cooperation by the Secretary of the Interior in formulating forest plans and practices and for forest fire protection work.

For the first time in American forestry, legislative authorization has been given for the creation and development of cooperative sustained yield units which may comprise forest lands under the jurisdiction of Federal and State agencies and private forest owners and operators. This is an entirely new kind of cooperative undertaking in American forestry, and it will provide a new approach to the practice of forestry in the United States.

Under the law of August 28, 1937, 75 percent of the gross income received from sales on the revested and reconveyed lands of Oregon must be returned to the counties of the State of Oregon and the Treasury of the United States, leaving 25 percent for the administration of the forests under appropriation by Congress. This requires forest planning within forest income so that the principles of sustained yield management may be carried out on a self-supporting basis. Not only is the policy of sustained yield of vital importance to the Nation, it is absolutely necessary to assure a continued existence of communities dependent on the continuing flow of timber into the channels of commerce.

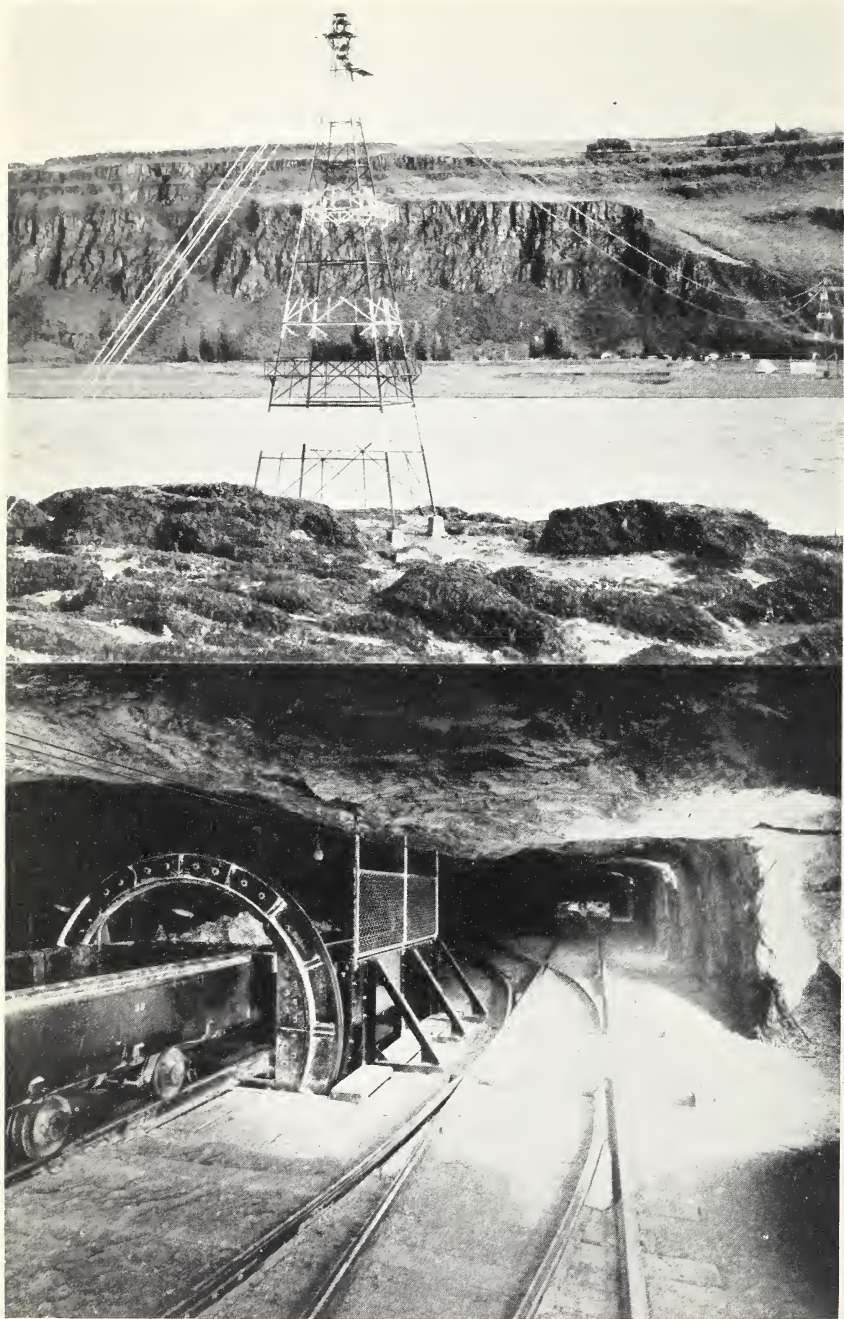
In addition to the intensive development for industrial advancement in the revested and reconveyed lands of Oregon, the Department of the Interior has the responsibility for conservation of Indian timber lands. Of the receipts from the sale of timber on Indian lands, 92 percent is returned to the Indians. Past experience has shown conclusively that sustained yield management is not only feasible and economically effective but that it is possible even under extraordinarily low administrative costs.

In addition to the primeval forests of the national parks and the commercial forests on the Oregon revested and reconveyed lands and on the Indian lands, there are forests on the public domain in the United States and Alaska under the jurisdiction of the Department which are managed primarily for watershed protection purposes.

Generally speaking, each of these types of forests present different problems of administration and conservation. However, many

forestry techniques, such as fire protection and insect control, and basic forestry principles apply to all these forests. Particularly is this true of the policy of conservation, a policy seeking the highest wise use for the greatest number of the people of the country within the limits set by congressional legislation.

Consequently, the establishment of the Office of Director of Forests in the Department of the Interior to promote a unified policy of forest conservation, forest planning and forestry management is not only a progressive step forward in general conservation, but it is in keeping with the basic principles of modern administration.



UPPER: MEASURING CABLE ON THE COLUMBIA RIVER.
LOWER: A POTASH MINE NEAR CARLSBAD, N. MEX.

GEOLOGICAL SURVEY

W. C. Mendenhall, *Director*

BASICALLY important in the general program of conservation and development were the results of the Geological Survey's work during the fiscal year 1938. Investigations of the Nation's mineral and water supplies were conducted with all possible vigor and dispatch, thousands of square miles were surveyed for topographic maps, and technical supervision was given to prospecting, mining, and producing operations on public and Indian lands. This work was accomplished through the use of the regularly appropriated funds, the co-operative funds from States, counties, and municipalities, the funds transferred from other departments of the Government for types of work within the Survey's field, and the emergency funds derived chiefly from the Public Works Administration and devoted largely to mapping of various types and to studies of floods. The aggregate expenditures amounted to \$5,248,000, which was \$265,000 less than the amount expended during the preceding year.

More than 3,600 analyses and tests of mineral and rock samples were made, including more than 1,100 for persons not officially connected with the Geological Survey.

New area to the extent of 13,500 square miles was surveyed in the field topographically. This work will yield contoured topographic maps of 198 areas in 35 States and in Puerto Rico. In addition, by the aid of aerial photography, 2,077 square miles was surveyed in four States for the production of planimetric maps without contours.

Fifty-six book publications of the Survey's regular series, and 23 pamphlets and circulars, aggregating more than 8,900 pages of printed matter, dealing with geology, mineral resources, and water supplies, were issued during the year, and about 822,000 copies of 312 topographic and other maps were printed. The geologic map of the Front Range, Colo., was prepared.

There were 63 geologic parties in the field in 35 States and Alaska. The field investigations on several continuing projects were completed, and work was begun on new projects, including geologic studies of areas in Idaho, Nevada, Colorado, and New Mexico. The

geologic investigation of the platinum deposits at Goodnews Bay, Alaska, which now form the principal domestic source of platinum metals in the United States, was completed.

Measurements of stream flow were maintained at 3,831 stream-gaging stations. All the States, the District of Columbia, and Hawaii are affected by this work. Flood studies were continued during the year. Analyses were made of more than 2,400 samples of underground or surface waters to determine the suitability of the waters for industrial, agricultural, or domestic uses.

In the administration of the land-classification and mineral-leasing activities of the Survey more than 15,000 reports were made on cases requiring an expression of opinion and advice. Mineral production during the year from public and Indian lands and naval petroleum reserves under supervision of the Survey had an estimated value of \$88,500,000, and revenue received by the Government as a result of this production amounted to about \$9,750,000. This revenue and the conservation of the mineral resources involved were attributable, both directly and indirectly, to supervision by the Survey, which insures orderly and complete development of those resources.

An allocation of \$2,690,000 from the Public Works Administration for scientific and engineering work, but chiefly for topographic mapping, will bring the total funds available for 1939 close to \$7,500,000, and the Geological Survey looks with high hope to the work that can be accomplished for the public good.

GENERAL SUMMARY OF THE YEAR'S ACTIVITIES

Geologic work.—Sixty field parties were active during the year, and work was done in 35 States. Work continued throughout the year in metal mining districts of Colorado, Idaho, New Mexico, the oil and gas region of Kansas, and in the Carboniferous areas of Illinois, in cooperation with the States. Physiographic and geologic studies were continued in the Yosemite, Sequoia, and Zion National Parks in cooperation with the National Park Service. Cooperation was also continued with the American Petroleum Institute. Several major projects begun in 1937 or earlier were continued, and those on the Colorado Front Range, the Metaline mining district, Washington, the La Plata district, Colorado, and on the Pottsville flora of Illinois, were completed. New projects include the mineral resources of Kootenai County, Idaho, in cooperation with the State, a geologic and geophysical investigation of the ore deposits of the Austin district, Nevada, geology and mineral resources of the Duck Valley Indian Reservation, Nev., for the Office of Indian Affairs, the Chattanooga and Gold Hill mining districts, Colorado, and the Big Hatchet Mountains, N. Mex. Work for other Federal bureaus included examinations of dam sites for the Corps of Engineers, work in the Yosemite and Sequoia National Parks, Calif., and in the Zion and Bryce Canyon National Parks, Utah, the examination of mineral deposits for the Tennessee Valley Authority, and special geologic investigations for the Public Health Service and for the Department of Justice. More than 3,600 analyses and tests of mineral and rock samples were made, including 1,147 for persons not officially connected with the Survey. Tests of bleaching clays and temperature measure-

ments of deep wells were continued. Mathematical tables for calculating temperatures were prepared, contributory to a long study of geothermal methods for estimating the age of the earth which is nearing completing.

Explorations in Alaska.—During the field season of 1937 five field projects were carried on by the Alaskan branch of the Geological Survey. Of these three were concerned principally with geologic investigations relating to the mineral resources of the Territory and two were primarily topographic. For the field season of 1938 six field projects had been started before the end of the fiscal year 1937-38 and one additional field project was to be undertaken as soon as practicable. All of these field projects will be continued throughout the open season as late as conditions permit. Other work included the usual collection of statistics regarding the production of mineral commodities, the answering of many inquiries relating to the mineral resources of the Territory, and office and laboratory studies required to prepare the results of the field surveys for publication.

Topographic mapping.—The area covered by new topographic surveys, resurveys, and revision amounted to 13,583 square miles, which comprises the entire area or portions of 198 topographic maps with contours. Topographic mapping was done in 35 States and in Puerto Rico. Cooperation was had with 16 States, Puerto Rico, and the Tennessee Valley Authority. The area covered by planimetric maps without contours, resulting from aerial photography, covered 2,077 square miles in 4 States. By a cooperative agreement with the Tennessee Valley Authority, the Geologic Survey mapped from aerial photographs by stereophotogrammetric methods 1,168 square miles covering in whole or in part 29 quadrangles. Fifteen stereophotogrammetric instruments have now been installed at the Chattanooga office of the Geologic Survey. The aerial photographic method of mapping is gaining in favor. There are many areas in the United States in which this method could be applied most economically. In addition to the routine adjustment of primary control, there has been in progress a general adjustment of both horizontal and vertical control to agree with the standard datums of the United States. During the year eight bulletins reporting the results of control surveys have been prepared, and three that were previously prepared were published. The office work on river surveys that were made by the Conservation Branch is steadily progressing. The maps of 28 projects, comprising 114 sheets, were sent forward for reproduction during the year. The preparation of the transportation map of the United States, in sections, for the Bureau of Public Roads, was continued, and maps of 5 States, comprising 38 sheets, were published. Work on the United States portion of the map of the world on the scale of 1:1,000,000 was resumed. One hundred and sixty maps were prepared for photolithographs and 97 for engraving, and 212 maps were prepared for reprinting. An exhibit comprising 40 maps was prepared and sent to the International Geographic Congress at Amsterdam, Netherlands.

Investigation of water resources.—The water-resources branch collected and made available for publication stream-flow records at 3,831 river-measurement stations in the 48 States, the District of Columbia, and the Territory of Hawaii, obtaining this authentic information on the behavior of streams in drought, in flood, and in normal conditions—information that is invaluable for intelligent planning of projects for use or control of the surface water supply. It investigated underground water supplies in 34 States and in Guam, Hawaii, and the District of Columbia and obtained basic information on the occurrence, quantity, and quality of underground water supplies which is essential for the development, conservation, and use of ground water upon which a large part of the population of the country must depend. Investigations of stream-flow and silt movement of streams in seven projects of the Soil Conservation Service, and similar studies on the Colorado River, have also been continued. Analyses, partial or complete,

were made of 2,474 samples of water from surface and underground sources with reference to the suitability of the waters for industrial and agricultural uses and for domestic use (aside from questions of health), so far as such use is affected by the dissolved mineral matter. The annual report on the capacity of water wheels in water-power plants in the United States of 100 horsepower or more on January 1, 1938, was compiled. Engineers of the branch had field supervision of operation under permits and licenses of the Federal Power Commission in connection with 155 projects. Investigations of the water problems along the international boundary between the United States and Canada were continued for the State Department. The collection of information on recent outstanding floods was continued.

Classifying public land and supervising mineral leases.—The conservation branch made 15,509 formal findings of technical fact involving the mineral resources, water power, or storage possibilities of public land; added 97,583 acres to outstanding water-power reserves and eliminated 5,890 acres therefrom; defined the known geologic structure of 1 producing oil and gas field involving 1,391 acres; completed 32 miles of river-utilization surveys and surveyed in detail 4 dam sites in public-land States; prepared 3 reports based on geologic and geophysical studies of formation materials and conditions at dam sites; administered activities and operations under 155 power projects licensed by the Federal Power Commission and 172 permits and grants from the Department of the Interior; supervised on public land 8,605 oil and gas holdings involving 4,334 productive wells and 731 coal properties, 39 potash properties, 66 sodium properties, 27 sulphur properties, 11 phosphate properties, and 1 oil-shale property involving 526 productive mines; assisted hundreds of oil and gas permittees and operators in preparation of unit plans of development and operation; classified approximately 7,800 outstanding oil and gas prospecting permits under the extension provisions of the act of August 26, 1937 (50 Stat. 842); supervised on naval petroleum reserves 22 leaseholds involving 519 productive oil and gas wells; and on Indian land 5,382 leaseholds involving 4,407 oil and gas wells, 235 mining properties involving 44 lead and zinc properties, 142 coal properties, and 49 other mineral properties; issued the revised coal operating regulations, effective December 23, 1937; changed territorial delineation of the three oil and gas supervisory districts and created a fourth supervisory district with headquarters at Roswell, N. Mex.

Publications.—The publications of the year consisted of 56 reports in the regular series and 23 pamphlets and circulars for administrative use, a total of 8,910 pages; 110 new or revised topographic and other maps and 202 reprinted maps. Among the book publications were reports on the geology of the Yukon-Tanana region, Alaska; the geology and mineral resources of areas in Colorado, Idaho, and Oregon; spirit leveling in Kansas, Missouri, and Vermont; records of water levels and artesian pressure in observation wells in the United States in 1936; ground water in south-central Nebraska and in areas in Arizona, Texas, and Utah; the thermal springs of the United States; the warm springs of Georgia; the floods of March 1936 in the eastern United States and floods in California and Texas; and several paleontologic papers. A revision of the operating regulations to govern coal-mining methods and the safety and welfare of miners on leased lands on the public domain was also issued. Besides these printed reports 24 brief papers were issued in mimeographed form as memoranda for the press or as informative circulars.

The engraving and printing division printed more than 822,000 copies of maps and did repay work amounting to about \$195,000 for 72 other units of the Federal and State Governments.

NOTE.—Detailed tabular statements are given at the end of the report.

GEOLOGIC BRANCH**SUMMARY**

Sixty field parties were active during the year, and work was done in 35 States. Work continued throughout the year in metal mining districts of Colorado, Idaho, New Mexico, the oil and gas region of Kansas, and in the Carboniferous areas of Illinois, in cooperation with the States. Cooperative investigations with the American Petroleum Institute were continued. Physiographic and geologic studies were also continued in the Yosemite, Sequoia, and Zion National Parks in cooperation with the National Park Service. Several major projects begun in 1937 or earlier were continued and those on the Colorado Front Range, the Metaline mining district, Washington, the La Plata district, Colorado, and on the Pottsville flora of Illinois, were completed. New projects include the mineral resources of Kootenai County, Idaho, in cooperation with the State, a geologic and geophysical investigation of the ore deposits of the Austin district, Nevada, geology and mineral resources of the Duck Valley Indian Reservation, Nev., for the Office of Indian Affairs, the Chattanooga and Gold Hill mining districts, Colorado, and the Big Hatchet Mountains, N. Mex. Work for other Federal bureaus included examinations of dam sites for the Corps of Engineers, work in the Yosemite and Sequoia National Parks, Calif., and in the Zion and Bryce Canyon National Parks, Utah, the examination of mineral deposits for the Tennessee Valley Authority, and special geologic investigations for the Public Health Service and for the Department of Justice. More than 3,600 analyses and tests of mineral and rock samples were made, including 1,147 for persons not officially connected with the Survey. Tests of bleaching clays were continued and aided further in placing an important paying industry on a firm foundation. Temperature measurements of deep wells were continued, and mathematical tables for calculating temperatures were prepared, contributory to a long study of geothermal methods for estimating the age of the earth, which is nearing completion.

WORK OF THE YEAR BY STATES

Alabama.—Additional field work was done in the Greasy Cove area, Etowah County, in connection with a study of iron ore in the Red Mountain formation in northeastern Alabama, and the investigation of the brown iron ore in the Russellville district was continued. Stratigraphic examinations were made of the Upper Cretaceous and Tertiary formations. An investigation for the Public Health Service was made of geologic and ground-water conditions in Coffee County, to determine their possible influence on the prevalence of tuberculosis.

Arizona.—Investigations were made of the geology and ore deposits of the Benson and Pearce quadrangles and of the manganese deposits in the Artillery Peak Mountains. A report on the ore deposits of the Tombstone district, prepared in cooperation with the Arizona Bureau of Mines, was transmitted to that

bureau for publication. Progress was made on reports on the geology and mineral resources of the Tucson quadrangle and on the geology and ore deposits of the Ajo quadrangle.

Arkansas.—A field study was made of quartz veins and some mineral deposits of Magnet Cove, Crystal Mountains, and other areas in western Arkansas. Papers on volcanic activity at Magnet Cove, taeniolite from Magnet Cove, unweathered manganese deposits of the Batesville district, and Pennsylvanian sedimentation in the Arkansas coal field were submitted for outside publication, and a paper on the influence of structure in localizing ore in the quicksilver deposits of southwestern Arkansas was submitted to the National Research Council. Bulletin 886-C on the geology and ore deposits of the southwestern Arkansas quicksilver district was issued. Reports on the fauna and stratigraphy of the Morrow group of Arkansas and Oklahoma, on recent developments in the Batesville district manganese deposits, and on the geology of the Fort Smith district are in preparation for official publication.

California.—A comprehensive report on the general geology, physiography, paleontology, and stratigraphy of the Kettleman Hills oil field and a report on the geology and ore deposits of the Grass Valley region are in process of publication. Studies of the Foraminifera of the Kreyenhagen shale of Garza Creek; stratigraphy, structure, and petrology of the siliceous rocks of the Monterey formation; the geology of the San Andreas Rift; the east front of the Sierra Nevada with regard to problems of the age of the fault escarpment; and the geology and mineral resources of the Death Valley region and of the Elsinore, San Luis Rey, and Corona quadrangles were in progress. Field investigations of the geologic structure, stratigraphy, and oil resources of the lower Tertiary strata in Reef Ridge in the Kettleman Plains and the Dudley No. 2 quadrangle in the Coalinga region, and of the geology and mineral resources of the Palos Verdes Hills, including a study of the Wilmington oil field, were completed. To obtain data for a study of source beds of petroleum, oil centers in California were visited. In cooperation with the National Park Service a geologic reconnaissance of the northwestern part of Yosemite National Park was continued. Papers were submitted for outside publication on the calcium carbonate content of some Mesozoic and Tertiary sediments, vein filling at Nevada City, arsenic from gold quartz veins of Grass Valley, and copper deposits in serpentine in southwestern Oregon and northwestern California as illustrated by the Cowboy mine.

Colorado.—The program for investigation of some mining regions in the State in cooperation with the State of Colorado and the Colorado metal mining fund was continued. Field studies of the Ouray district in the San Juan region, of the Cripple Creek district, and of districts in the La Plata Mountains were completed. Other studies were made in the Gold Hill mining district, in the Idaho Springs and Central City districts in the Front Range, and in the Chattanooga and Kokomo-Robinson districts. A paper on copper ores of the La Plata district and an explanatory text to accompany the geologic map of the Front Range mineral belt were submitted to the Colorado Scientific Society for publication. Other papers to be published outside were prepared on the Laramide igneous sequence and differentiation in the Front Range, stoping and assimilation in a granodiorite stock at Jamestown, and the Leadville district (National Research Council). A memorandum for the press was issued on platinum metals in a Colorado copper district. Progress was made on reports on the geology and ore deposits of the Ouray district, the Front Range, the La Plata district, the Jamestown mining district, the Kokomo-Robinson district, the Cripple Creek district, the Gold Hill mining district, and on the Nederland tungsten deposits, Paleozoic stratigraphy in the Sawatch Range, and the geology and mineral resources of the west slope of the Mosquito Range. Non-cooperative investigations

in the State consisted of completion of field studies in the Yampa coal field, in northwestern Colorado. A report on the alkaline rocks of Iron Hill was submitted for official publication, and papers on plagioclase and orthoclase feldspar from the Tertiary rocks of the San Juan region for outside publication. A report on the geology and mineral resources of the Snowmass Mountain area was published as Bulletin 884.

Florida.—A study of the physical geography of the State in cooperation with the Florida Geological Survey is in progress. A geophysical survey was made across the peninsula in north-central Florida, and stratigraphic and paleontologic studies were made of the Tertiary formations of the State and on the gastropods of the Alum Bluff group. A report on phosphate investigations in 1934-35 was completed for official publication. A paper on the molluscan fauna from the upper bed at the A. L. Parrish farm, Washington County, with notes on the Foraminifera from the upper and lower beds at the same locality, was submitted for outside publication.

Georgia.—The detailed areal mapping and study of ore deposits in the Cartersville district and the investigation of the geology of the Coastal Plain of Georgia, in cooperation with the Division of Mines, Mining, and Geology of Georgia, were continued. A reconnaissance study was made of the Upper Cretaceous formations of the State for the purpose of correlating these formations with those of Mississippi and Alabama. A report on the warm springs of Georgia and their geologic relations and origin was published as Water-Supply Paper 819. A paper on stratigraphy of the Coastal Plain of Georgia was published in the Bulletin of the American Association of Petroleum Geologists.

Hawaii.—A geophysical survey in the Hawaiian Islands was undertaken for the purpose of determining water supplies.

Idaho.—Cooperation with the Idaho Bureau of Mines was continued in studies of geology and ore deposits of the Dixie mining district, the placer deposits of central Idaho, the dry belt of the Coeur d'Alenes, the mining district in Kootenai County, the Atlanta-Rocky Bar mining district, the Florence mining district, and the Boise Basin. A report on geology and ore deposits near Murray was transmitted for publication by the Idaho Bureau of Mines, and papers on structural setting of veins in the Elk City and Warren districts and influence of structure in localizing ore in the Boise Basin were submitted to the National Research Council. Noncooperative projects consisted of a reconnaissance of physiography and glacial geology of eastern Idaho and detailed mapping of the geology and mineral resources in the Borah Peak, Irwin, Ammon, and Paradise Valley quadrangles. Bulletin 877 on the geology and ore deposits of the Bayhorse region, Custer County, was issued.

Illinois.—Cooperation with the Illinois Geological Survey in the study of the Pottsville flora of the Eastern Interior Basin was continued, and studies of the Fusulinidae of the Pennsylvanian series in Illinois were in progress. A paper on the origin of the bedding replacement deposits of the Illinois fluorspar field was prepared for outside publication.

Indiana.—A preliminary account of the flora of the New Albany shale of Indiana and Kentucky was submitted for outside publication. A paper on gastropods from the Spergen formation is in preparation. The report on the Pottsville flora of the Eastern Interior Basin is mentioned under Illinois. A study of Devonian fossils and stratigraphy is mentioned under Michigan.

Kansas.—In cooperation with the Geological Survey of Kansas, investigation of the subsurface Mississippian rocks was continued and a study of subsurface rocks of pre-Chattanooga age was begun. A temperature investigation of shallow shoestring sand pools in southeastern Kansas and northeastern Oklahoma and

geophysical observations in oil and gas districts of eastern Kansas were made. A paper on oil and gas resources of western Kansas was submitted to the American Association of Petroleum Geologists and one on Mississippian rocks of Labette County to the Kansas Geological Survey for inclusion in a State report on that county. Studies of source beds in Kansas and of the lead and zinc deposits of southeastern Kansas included in the Tri-State district are mentioned under Oklahoma.

Kentucky.—A report on additions to the Wilcox flora from Kentucky and Louisiana was completed for official publication. Work on the Pottsville flora of the Eastern Interior Basin is mentioned under Illinois. Preliminary account of the flora of the New Albany shale is mentioned under Indiana. A study of Devonian fossils and stratigraphy is mentioned under Michigan.

Louisiana.—A revised edition of the map of Louisiana, showing oil and gas fields, salt domes, and prospects, was prepared. A report on the Wilcox flora is mentioned under Kentucky.

Maine.—A study of the granites on Crotch and Deer Islands in the Stonington district was made in connection with a study of commercial granites and mapping granite quarries in New England.

Maryland.—In informal cooperation with the Maryland Geological Survey a geologic map with structure sections of Frederick County, including parts of Carroll and Washington Counties, was transmitted to the Maryland Geological Survey. Geophysical investigations in the Soldiers Delight and adjacent area were continued.

Massachusetts.—Study of commercial granites and mapping granite quarries in New England included granite areas in Massachusetts.

Michigan.—The resistivity survey of some oil districts near Lansing by members of the geophysical section in cooperation with the Department of Conservation of the State of Michigan was completed and the report transmitted to the State for publication. Studies of Devonian fossils and stratigraphy in Michigan, Indiana, Kentucky, and Ohio were continued.

Mississippi.—Studies of the stratigraphy of the Upper Cretaceous deposits and of the geology of the Jackson gas field were continued, and a paper on the State's deep test well in the Jackson gas field was sent to the Mississippi Geological Survey for publication.

Missouri.—A report on the stratigraphy and fauna of the Louisiana limestone of Missouri was transmitted for publication, and work on a paper on the Warsaw fauna of the Joplin district was continued.

Montana.—General reconnaissance studies of the physiography and glacial geology of portions of western Montana, northwestern Wyoming, and eastern Idaho, detailed studies of the geology and the coal, gas, and oil resources of the Little Rocky Mountains and adjacent areas, and an investigation of scarps and other evidences of Pleistocene and Recent faulting in southwestern Montana were continued. Field examinations of geologic structure and fuel resources of a part of Carbon County and of the geology and coal resources in the Otter Creek area, Powder River, Rosebud, and Big Horn Counties, were begun. An examination of the Willow Creek dam site in the Crow Indian Reservation near Billings was made for the Office of Indian Affairs. Reports for official publication on the geology and mineral resources of the Black Hills rim, in Montana and Wyoming, and of the Libby quadrangle, and on fossil plants from the Fort Union and associated formations in Montana, North Dakota, and Wyoming, were in progress. Papers were submitted for outside publication on amphibolization of sills and dikes in the Libby quadrangle, on the influence of structure on ore deposits in the Libby quadrangle, on structural features of the Flathead mine, and on Kinderhook conodonts from the Little Rocky Mountains.

Nevada.—Field and office work on the projects covering the general geology and ore deposits of the Hawthorne and Tonopah quadrangles, the Comstock lode at Virginia City, and the structure of the Basin Range, were continued. A study of the Austin or Reese River district was begun. Geophysical studies were made in the Austin and Spring Valley districts. An examination of ore deposits in the Duck Valley Indian Reservation was made for the Office of Indian Affairs. A paper on Mesozoic stratigraphy of the Hawthorne and Tonopah quadrangles, was submitted for outside publication.

New Hampshire.—In connection with an investigation of the granites of New England, studies were made of the granite districts in New Hampshire.

New Jersey.—A report on pre-Cambrian geology and mineral resources of the Delaware Water Gap and Easton quadrangles, New Jersey and Pennsylvania, was transmitted for official publication.

New Mexico.—The study of the geology and ore deposits of the Little Hatchet Mountains conducted in cooperation with the New Mexico Bureau of Mines was continued. A paper on the outlook for new ore discoveries in the Little Hatchet Mountains was submitted for outside publication. A field examination of the geology and the coal, oil, and gas resources of the eastern side of the San Juan Basin in Rio Arriba County was continued. Official reports covering this and earlier investigations, including a study of the Lumberton-Monero district, were in progress and also one on the Potash special quadrangle. A preliminary map showing geologic structure of part of Rio Arriba County was published. A correlation chart for the Permian of western Texas and southeastern New Mexico, and a short summary of the influence of structure in localizing ore in the Ground Hog mine, central district, were prepared for the National Research Council. A paper on a newly discovered section of Trinity age in southwestern New Mexico was prepared for the American Association of Petroleum Geologists.

New York.—A report on talc in the Gouverneur district, the field work for which was done several years ago on an allotment from Public Works Administration is nearing completion for official publication. A paper on some Psilophytales from the Hamilton group in western New York was prepared for outside publication. Bulletin 899-A on structure and gas possibilities of the Oriskany sandstone in Steuben, Yates, and parts of the adjacent counties, was issued.

North Dakota.—A report on the geology and coal resources of the Minot area is in course of publication. Work on the Fort Union and associated formations is mentioned under Montana.

North Carolina.—A report on gastropods from the Miocene and lower Pliocene of Virginia and North Carolina, with summary of stratigraphy, was completed for official publication.

Ohio.—A study of the stratigraphy and fossils of the Devonian of Michigan and Ohio was continued. A study of the stratigraphy and faunas from the Devonian and Carboniferous formations is mentioned under Pennsylvania.

Oklahoma.—The investigation of the geologic structure, stratigraphy, and petroleum possibilities in the Ouachita Mountains was extended. Preparation of reports on subsurface geology and oil and gas resources of Osage County was continued, and those covering Tps. 22 and 23 N., Rs. 8, 9, 10, and 11 E., and Tps. 24 and 25 N., Rs. 8 and 9 E., are in course of official publication. In the investigation of the lead and zinc deposits of the tri-State area, mapping the geologic structure and stratigraphy and study of the mines of the Oklahoma and Kansas portions of the district were continued. Reports on stratigraphy and fossils of the Moorefield formation and of the Morrow group of Arkansas and Oklahoma were in progress. A new edition of the map of the oil and gas fields of Oklahoma is in preparation. In connection with a comprehensive study of source beds of petroleum conducted in cooperation with the American Petroleum Institute,

localities in Oklahoma and Kansas were visited. A paper on some studies of source beds in Oklahoma and Kansas and a paper on the Verden sandstone of Oklahoma—an exposed shoestring sand of Permian age—were published by the American Association of Petroleum Geologists.

Oregon.—A report on the geology of a part of the Wallowa Mountains was transmitted to the Oregon State Department of Geology and Mineral Industries for publication, and a paper on the geology of the Salem Hills and the North Santiam River is in preparation for publication by the State. A preliminary geophysical investigation of the Sourdough chromite deposits in Oregon was made for the State Department of Geology and Mineral Industries. Bulletins 875 (Nonmetallic mineral resources of eastern Oregon), 879 (Geology and mineral resources of the Baker quadrangle), and 893 (Metalliferous mineral deposits of the Cascade Range in Oregon) were issued.

Pennsylvania.—Reports on the geology and mineral resources of the Honeybrook and Phoenixville quadrangles and of the Hanover and York quadrangles have been completed for official publication. Additional field work was done in York County in connection with a report on the geology and mineral deposits of York County in cooperation with the State of Pennsylvania. A report on a dam site on Codorus Creek, York County, was made for the War Department. Studies of the regional metamorphism in the Lower Kittanning coal beds of western Pennsylvania, and of the stratigraphy and flora of the Pocono formation of Pennsylvania, Virginia, and West Virginia, were continued. A report on some linguloid shells from the late Devonian and early Carboniferous rocks of Pennsylvania and Ohio was submitted for official publication, and a paper on garnet crystals in cavities in metamorphosed Triassic conglomerate in York County and a discussion of a paper by Ralph Miller on the Martinsville limestone in eastern Pennsylvania were submitted for outside publication. Work in the Delaware Water Gap and Easton quadrangles is mentioned under New Jersey.

Southern Appalachians.—The report on gold deposits of the southern Appalachians, including areas in Virginia, North Carolina, South Carolina, Georgia, and Alabama has been submitted for publication.

Tennessee.—Field work for revision of the mapping of the Knox dolomite of the Mascot-Jefferson City district in east Tennessee and for a study of the manganese deposits of Perry County was carried on in cooperation with the Division of Geology of the Tennessee Department of Conservation. Investigations of geologic and ground-water conditions in Giles County were made for the Public Health Service to determine their possible influence on the prevalence of tuberculosis.

Texas.—Reports were in preparation on the structure, stratigraphy, and fossils of the Navarro group, and on the stratigraphy, geomorphology, and structure of the southern Guadalupe Mountains. Field work was continued in a study of the geology of the Sierra Diablo region, west Texas, and in a study of the stratigraphy and fossils of the Eocene of southeastern Texas, and stratigraphic and paleontologic investigations of the Carboniferous and Permian formations of central Texas were made. A resistivity survey for the purpose of obtaining additional information as to the effects of faults and salt-water boundaries was made in the vicinity of El Paso. Professional Paper 187, on the geology of the Marathon region, was completed. A report on a new Upper Cretaceous rudistid from Texas and on fossils from the Eocene of the Gulf province and a revision of the map of the oil and gas fields of Texas are in process of publication. A correlation chart of the Permian of Texas and southern New Mexico was prepared for the National Research Council. Papers were prepared for outside publication on paleogeography and correlation of the west Texas Permian, a new taxodont genus from the Upper Cretaceous of Texas, and tectonics of the Guadalupe Mountain region.

Utah.—Geologic studies of a part of the Strawberry Valley with special attention to oil shale, coal, oil, gas, and phosphate; of the coal resources and oil and gas possibilities of the Hanksville-Caineville district; and detailed studies of the structure, igneous rocks, mineral resources, and physiography of the Henry Mountains; of the Marysvale district, with special reference to alunite deposits; and of iron ores of Bull Valley were continued. An examination of a manganese deposit on Drum Mountain in Juab County was made and a report on these deposits transmitted for outside publication. Geologic investigations were continued of the geology and physiography of the plateau regions of Utah and in Zion and Bryce Canyon National Parks and Cedar Breaks National Monument in cooperation with the National Park Service. An examination of asphalt deposits of the Uinta Indian Reservation in northeastern Utah was made for the Office of Indian Affairs. The report on the geology and mineral resources of the Randolph quadrangle was transmitted for official publication. Outside publications included a paper on the origin of the Bull Valley iron ore deposits, comment on J. D. Forrester's paper on structure of the Uinta Mountains, and a paper on form of intrusion in the Henry Mountains.

Vermont.—The studies of commercial granites and mapping granite quarries of New England included granite areas in east-central Vermont.

Virginia.—Geologic work was conducted in the Galax, Independence, Rural Retreat, Mouth of Wilson, Mount Rogers, Max Meadows, and Speedwell quadrangles in connection with a study of the Gossan lead in cooperation with the Virginia Geological Survey. A paper on a southeastern facies of Lower Cambrian dolomite present in southwestern Virginia was sent to the Virginia Geological Survey for publication. Field investigations were made in the Appalachian Valley of Virginia in connection with a study of the Lower Paleozoic stratigraphy of the Appalachian Valley, and work on revision of a report on the titanium deposits was continued. A paper on relations between structure and ore deposition in the Titanium district near Roseland was completed for the National Research Council. Work on the Pocono flora is mentioned under Pennsylvania. Work on mollusca from the Miocene and Lower Pliocene is mentioned under North Carolina.

Washington.—Field investigation of the areal geology, mineral resources, and mines of the Metaline quadrangle, Pend Oreille County, was completed. A paper on dolomite and jasperoid in the Metaline district was transmitted for outside publication. In the later part of the fiscal year a study of the manganese deposits in the Olympic Peninsula was initiated.

West Virginia.—Work on the Pocono flora from Virginia, West Virginia, and Pennsylvania is mentioned under Pennsylvania.

Wyoming.—Areal and structural geologic mapping, with particular reference to coal and petroleum resources, of areas on the west and east sides of the Big Horn Basin was continued. Investigations of the Tertiary rocks of the Green River and Bridger Basins, and fossil syncline of southwestern Wyoming, with special reference to oil-shale beds, and of the geology and mineral resources of the Afton quadrangle were continued. A structural map of the Byron-Frannie area, Big Horn and Park Counties, was published. A report on geology and coal resources of the area south of Cody and one on the Shoshone area, Park County, are in preparation. Work in the Irwin quadrangle and on glacial geology and physiography is mentioned under Idaho. Work on the Black Hills rim and on the Fort Union and associated formations is mentioned under Montana.

General studies.—General investigations included Foraminifera of the Cretaceous formation of the Gulf Coast region, the genus *Ceratopea*, Tertiary echinoids of the eastern United States, Buliminidae, Globigerinidae, borderland problems of geology, physics, and chemistry, types and ranks of coal, source beds of petroleum, clay minerals, salt-dome cap rock, deep-sea cores from across the North Atlantic

Ocean, and a core sample from the deep-sea bottom southeast of New York City. A revision of a bulletin on microscopic determination of the ore minerals was completed for official publication. Geophysical abstracts covering the period from July 1936 to March 1938 were issued or are in course of publication.

WORK IN CHEMISTRY AND PHYSICS

Increasing attention during the past year has been given to chemical mineralogy, with special consideration of the internal structure of minerals. It is now possible to show that the physical properties of a mineral depend not only on the kinds of atoms composing it but also on their role and their arrangement in the crystal—features that can be determined by X-rays. The densities of strata, rocks, and minerals likewise, in the final analysis, are explained in the same way. It seems reasonable to expect that further study of the associations and conditions of formation of minerals will yield illuminating correlations with both their chemical composition and physical structure. Information on all the physical properties of rocks and minerals is being compiled in collaboration with the National Research Council.

During the year the stability relations of the different hydrates of sodium borate were studied further; also the optical properties of numerous minerals for many localities, including several manganese minerals, micas, sulphates from the Comstock lode, and many other minerals. Platinum and palladium were definitely identified in ore from the La Plata district, Colorado. A clay deposit in Iowa was shown to be mainly halloysite. Sodium sulphate is now being produced from a deposit in Texas, a sample of which was first identified as sodium sulphate among many samples sent in by the public for identification. Over 30 manuscripts were read critically by members of the section of chemistry and physics.

Altogether 3,636 examinations or tests of minerals and rock samples were made during the year. These included 1,147 specimens tested and identified for persons not officially connected with the Survey. There were 939 chemical analyses made for geologists and 493 similar analyses made in connection with research problems and geochemical investigations. The remaining 1,057 tests related to core samples, well cuttings, and similar materials.

Special investigations included a study of the base-exchange properties of river clays, a matter that will afford a correction of the previously calculated age of the ocean; the analysis and structural interpretation of several varieties of mica, especially taeniolite, lithiophyllite, and lepidolite, which have led to a better understanding of the relations between the different micas; elaborate mathematical studies relating to the flow of heat in the earth; the development of new methods of chemical analysis; and adjustment of estimates of the lengths of the geologic eras and periods in years, based both on geologic and radioactive evidence.

Spectrographic tests were made on many different minerals and ores, and minor constituents obtained in chemical work were more positively identified in this way. Crystallographic measurements were made of a number of minerals. Cuttings from a considerable number of wells were logged to determine the character of the strata at depth. Materials mined under royalties to the Government, such as potash, were checked as to quality and quantity. Assays were made for gold, silver, and platinum in a number of metalliferous samples.

Among minerals analyzed in the laboratory during the year were sodalite from Magnet Cove, Ark., pyrophyllite from Staley, N. C., many igneous rocks associated with ore deposits in the Western States, talc from Quebec, alunite from Nevada, potash brines from Utah and Wyoming, pumicite, oceanic clays, mica, mine waters, siderite from several mines, tetrahedrite, vermiculite, grahamite, dolomite, halloysite, trona, phosphate rock, vanadiferous sandstone, native gold and platinum, albite, rhodochrosite, alunogen, and other similar substances.

A monograph on bleaching clays was completed, covering their geographic and geologic distribution, their physical and chemical properties, and their processing, rating, and testing. This summarizes 8 years of intensive work and puts an important key industry on a firm foundation. All lubricating oils, most fats and waxes, many paint oils, all medicinal oils, and much sulphur are processed with bleaching clay. For this work over 4,000 samples of clays from the United States and many foreign countries were investigated. New classifications and new methods of testing and rating were developed. Extensions of chemical and physical methods of clay analysis were developed to add to the knowledge of their structure and properties, and new occurrences of bleaching clays have been discovered.

A paper was prepared on observed temperatures in the crust of the earth for publication by the National Research Council. A program was outlined for calculation of certain mathematical tables by the Works Progress Administration, and a temperature survey was made of a 7,000-foot well near Washington, Pa. Tables were prepared for calculating the temperatures in a radioactive and a nonradioactive earth and also for calculating the temperature changes resulting from the flow of solar heat into and out of the earth for depths not exceeding 100 feet. The last two sets of tables are to be included in a final report on earth temperatures. A paper on geothermal methods of estimating the age of the earth is nearly completed.

The temperature machine which has been developed during the past few years is practically complete and has given highly satisfactory service. One of these machines is being used by the National Park Service in making a depth (and possibly also a temperature) survey of Crater Lake, Oreg.

A number of involved mathematical equations were solved by elaborate calculations.

Several field trips were made and papers were presented at regular meetings of the American Geophysical Union, the American Chemical Society, and various geological and mineralogical societies.

ALASKAN BRANCH

The work of the Geological Survey in Alaska is comparable in its aims with that performed in the various States, the principal differences being in the placing of the emphasis and in the methods used. Thus, because of the unsettled, undeveloped, and unknown character of much of Alaska, there is less immediate need for intensive detailed studies but more pressing calls for exploratory and reconnaissance surveys; less need for delimiting the precise boundary of a particular mineral area and more for determining the areas of economic importance. The training and experience required for carrying on such pioneer surveys are markedly different from those effective in intensive research on detailed problems, and the technique involved in the two types of investigation differs as greatly as does the art of the painter of miniatures from that of the painter of cycloramas. This condition in Alaska but repeats, in a measure, the history of the development of the Government's surveys in the States, where exploration preceded reconnaissance, and reconnaissance in time gave place to more detailed surveys. The stages of exploration and reconnaissance in Alaska are still far from being ended. More than half of the Territory has not yet been surveyed on standards that are regarded as adequate for reconnaissance purposes, and less than 1 percent has been surveyed on standards acceptable for detailed investigations. At the rate at which the work is now being carried on in Alaska many generations will have come and gone before even reconnaissance maps of the whole Territory are available. That the results of these investigations are urgently needed and widely used is shown by the large number of reports and maps sold and by the many requests for information, much of which cannot be supplied because the investigations or surveys have not yet been made. The reports and maps are widely used, especially by those concerned with the mining industry, and as they are the only authoritative sources of information for much of the country, they are indispensable to legislative and executive officers of the Government and others in the effective planning and successful conduct of many undertakings, such as airplane communication, roads, forestry, and national defense.

Field work.—As the field projects in Alaska do not lend themselves well to description by fiscal years, because the field work is usually started in May and continues as late in the fall as practicable, they will be described by field seasons. Thus, the projects undertaken in the field season of 1937 were financed in part from

funds appropriated for the fiscal year 1937 and in part from funds for the fiscal year 1938, and the projects for the field season of 1938 were financed by funds for the fiscal years 1938 and 1939.

For the field season of 1937 five field projects were carried on by the Alaskan Branch of the Geological Survey. Three of these were concerned principally with geologic investigations relating to the mineral resources of the Territory, and two were primarily topographic surveys. The areas in which the principal new geologic projects were undertaken were on Admiralty Island and adjacent tracts in southeastern Alaska; in the Alaska Range near the head of the Copper River; and in the vicinity of Goodnews Bay, near the mouth of the Kuskokwim River, in western Alaska. The surveys on Admiralty Island were designed to afford information regarding the possibility of the area containing deposits of nickel that might be of national importance, as well as to obtain additional facts regarding the occurrence and mineralization of the gold lodes that have long yielded a small but constant output of gold from the island. The part of the Alaska Range that was surveyed is among the least known areas, and the principal object of the work was to determine the general features of the geology and whether the geologic conditions are favorable for the occurrence there of deposits of lode and placer gold and other minerals similar to the deposits already known in the outskirts of the area. The work near Goodnews Bay focused on a study of the platinum deposits that now form the principal domestic source of platinum metals in the United States. The topographic projects included reconnaissance surveys in parts of the Alaska Range near the head of the Copper River and detailed and reconnaissance surveys in the platinum fields and adjacent areas of the Goodnews Bay district.

For the field season of 1938 six field projects had been started before the end of the fiscal year 1938, of which three are primarily geologic and three are primarily topographic. An additional field project for this season will be started as soon as practicable. All these projects will be continued in the field throughout the open season as late as conditions permit and will then be completed in the office.

The three geologic projects for the season of 1938 include work on Chicagof Island in southeastern Alaska, in the Copper River region, and in the upper Yukon region. The survey of part of Chicagof Island will embrace one of the large lode-gold areas in the western part of southeastern Alaska, and the study will be directed toward determining the conditions attendant on mineralization there in the hope not only of understanding the immediate conditions but of gathering information that may be of service in searching for similar deposits in areas where commercial deposits have not yet been found. The work in the Copper River region will be a continuation of the studies that have been in progress for 4 years to determine the facts regarding the extensive tract that lies in and adjacent to the Alaska Range. The investigations in the upper Yukon region will cover a part of the old fossil gravel deposits that extend for 100 miles to the northwest of Eagle and that appear to have been the source from which was derived much of the gold that was later reconcentrated by the present streams to form the workable placers now being extensively mined. The three topographic projects include surveys on Chicagof Island, in the Copper River region, and in the Tanana Valley. The first two are needed for immediate use by the geologists working in these areas, and the maps, when completed, will also be available for general use and will thus reduce somewhat the blank areas in the Territory. The survey on Chicagof Island is being made on a relatively detailed scale, but that in the Copper River region will be mainly of the reconnaissance type, except for a small area near the principal mine, which will be in more detail. The topographic work in the Tanana Valley will consist of photographing from

the air by means of special cartographic cameras the lowland of the Tanana River from Fairbanks eastward to the international boundary, an area of some 7,000 to 10,000 square miles of country, most of which has not been surveyed at all or at best only on crude exploratory standards. Unfortunately, lack of funds will probably prevent the Geological Survey from promptly taking off the information afforded by these pictures and working it up into maps, but this will be done as rapidly as funds and personnel become available. The preparation of maps of this area is of great importance in the consideration of almost all matters affecting transportation and development throughout this part of Alaska. Similar surveys and maps should be prepared of the other great natural routes through the interior, such as the entire lowlands of the Yukon River and its larger tributaries and of the Kuskokwim River and its tributaries.

Office work.—After completion of field work each season much office and laboratory work is required in analyzing the specimens collected, identifying by microscopic and other means the rocks and minerals found, perfecting the field sketches and drawings, and interpreting the various geologic phenomena observed, so that the significant facts are revealed and can be intelligibly expressed by maps and reports that are published and become available to the public. It is usually reckoned that these office studies and work require about twice as long as the original field work, so that if the original field work was done in 100 days it requires about 200 days to prepare the results for publication. If the results are not thus made available the public loses much of the value of the investigation for which it has paid.

An office project not directly related to new field work but requiring familiarity with the mining industry of Alaska is the annual canvass of the production of minerals from the Territory. This work involves analysis and tabulation of returns from mine operators throughout the Territory as to their year's output of any kind of minerals of value and the checking of these results by information from any other sources that will make it possible to give complete and correct records of the amount of each kind of mineral produced, the districts from which it came, and the new developments that have taken place or are in prospect. This work has been completed for the year 1937 and the results prepared for publication; the canvass for 1938 is under way.

Reports and maps.—During the year six reports containing maps, seven separate maps (including two new editions and three reprints), and five press statements have been published. Ten reports including maps, one separate map, and new editions or revisions of three maps are in course of publication. In addition three reports, one map, and new editions of two maps were partly completed. Five papers prepared by personnel of the Alaskan Branch were approved for outside publication.

TOPOGRAPHIC BRANCH

GENERAL OFFICE WORK

Necessary office work incidental to the field work of the Topographic Branch consisted in the inking, inspection, and editing of the completed topographic field sheets prior to their submission for reproduction and the computation and adjustment of the results of control field work and photo-planimetric compilation.

Control Section.—In addition to the routine adjustment of primary control, there has been in progress a general adjustment of both horizontal and vertical control to agree with the standard datums of the United States.

During the year the manuscripts for eight bulletins reporting the results of control surveys were prepared. Three bulletins for which the manuscript had been prepared previously were published. Spirit leveling in Kansas, 1896-1935 (Bulletin 889); in southeastern Missouri, 1896-1937 (Bulletin 898-A); and in Vermont, 1896-1935 (Bulletin 888).

Section of Photo-mapping.—In the section of photo-mapping, aerial photographs were used for the compilation of planimetric bases of sixteen $7\frac{1}{2}'$ quadrangles or parts of quadrangles in Louisiana and two $7\frac{1}{2}'$ quadrangles in Michigan, a total of 977 square miles. After the customary field inspection, these maps are published as planimetric maps. Line bases to assist in topographic mapping were likewise compiled of nine $7\frac{1}{2}'$ quadrangles in Massachusetts and fifteen $7\frac{1}{2}'$ and $15'$ quadrangles in Missouri, a total of 1,975 square miles, making a grand total of 2,952 square miles. Thirty-six square miles in Virginia and 49 square miles in Montana were mapped by the stereophotogrammetric method in the Washington office.

Cartographic Section.—Work on preparing additional sheets of the United States portion of the map of the world on the scale of 1:1,000,000 was resumed. Sheet J18, Chesapeake Bay, is in progress.

For the Bureau of Public Roads the work of preparing the transportation map of the United States was continued. Compilation and inking were in progress on 80 sheets. Proofreading and checking was done on 38 sheets. Maps of 5 States, comprising 38 sheets, were published.

Section of Inspection and Editing.—During the year 160 new maps were prepared for photolithographs as advance sheets. One hundred three new topographic maps were edited for publication, 6 of which were for three-color lithographs, and 97 for engraving. The preparation of quadrangle maps for reprinting is a large item in the work of the branch. Two hundred twelve quadrangle maps and 17 State and index maps were prepared and edited for reprint editions. Editing was also completed on 149 illustrations. Three hundred eighty-one proofs of maps in course of publication were read.

On June 30, 1938, in the Washington office, 126 topographic maps were prepared or partly prepared for lithography and 103 were in different stages of editing.

For the Conservation Branch the work of preparing river surveys for publication was continued. Work was done on 69 different projects. The maps of 28 projects, comprising 114 separate sheets, were transmitted for lithography during the year.

For the Tennessee Valley Authority the work of final preparation and transmitting of 12 maps for reproduction and the reading of 8 proofs was done.

During the year an exhibit of 40 maps was prepared for the International Geographic Congress to be held in Amsterdam, Netherlands, during July 1938.

MAP INFORMATION OFFICE

In January 1920 the Map Information Office, authorized by Executive order of December 30, 1919, was organized in the Geological Survey as part of the Topographic Branch. Since that time it has been conducted entirely by Geological Survey personnel.

The files of the office contain samples of practically all types of maps published by the Federal mapping agencies, many maps of foreign governments and commercial map publishers, catalogs and index maps, and a card index for reference, which is much used by Government agencies and the general public. In addition to its functions as a clearing house for map information, the office has also been given the task of collecting, classifying, and disseminating information concerning all aerial photography throughout the United States, both of a Federal and non-Federal character.

The office is used as a clearing house for all aerial topographic data similar to that for maps. One of the accomplishments of the year was the compilation and publishing, for the Board of Surveys and Maps, of an index map of the United States on which were shown all areas photographed up to March 1937.

Also, all of the minutes of the meetings of the Federal Board of Surveys and Maps have been taken, and all correspondence relating to the Board is done, by Geological Survey personnel.

FIELD SURVEYS

Work was done in 35 States and in Puerto Rico. Cooperative projects were conducted in 16 of these States and in Puerto Rico and with the Tennessee Valley Authority.

The art of making topographic maps from aerial photographs by the use of stereophotogrammetric methods is well established in the United States. By a cooperative agreement with the Tennessee Valley Authority, the Geological Survey is mapping areas within the Tennessee River Basin. On June 30, 18 Geological Survey employees were detailed on this project. Fifteen stereophotogrammetric plotting instruments are installed at Chattanooga, where the work is being done.

Of the area of the United States 45 percent has been covered by topographic maps, the year's increment amounting to 0.2 percent. The reduced percentage, as compared with 47.4 reported in 1937, is due to the fact that during the year maps of 79,668 square miles, based on reconnaissance surveys prior to 1896 and considered inadequate, have been withdrawn from distribution and the areas classified as unmapped.

WORK OF THE YEAR BY STATES

Abbreviations for projects listed below: Federal Emergency Administration of Public Works, "P. W."; Tennessee Valley Authority (by stereophotogrammetric methods) "T. V. A."

Arizona.—In preparation for geologic mapping, Klondyke 15' quadrangle completed and Galiuro Mountains 15' quadrangle begun. For the Forest Service, San Vicente 15' quadrangle completed. At the request of the National Park Service, Canyon de Chelly National Monument begun. Diamond Butte 15' quadrangle (P. W.) completed.

Arkansas.—In cooperation with the Geological Survey of Arkansas, Blakemore 15' quadrangle completed and Lonoke 15' quadrangle begun. Benton 15' quadrangle (P. W.) begun.

California.—In cooperation with the State engineer of California, Colton and Jurupa Mountains 7½' quadrangles completed. In preparation for geologic mapping, Grizzly Ridge 15' quadrangle completed. For the National Park Service, the revision of Sequoia and General Grant National Parks completed.

Colorado.—In cooperation with the Metal Mining Fund of Colorado, Dunton mining area and Ward Sunset mining area completed. In cooperation with the city of Denver, Arvada, Brighton, Fort Logan, and Long Branch 7½' quadrangles completed; Diamond K Ranch, East Lake, Fitzsimons, Golden, Littleton, Lafayette, Marshall, and Morrison 7½' quadrangles and the cultural revision for areas within the city limits of Denver begun. In preparation for geologic mapping, Clinax 15' quadrangle begun and Gold Hill mining area completed. At the request of the National Park Service, Great Sand Dunes National Monument completed. Mount Gunnison 15' quadrangle continued for the Forest Service.

Connecticut.—Uncasville 7½' quadrangle (P. W.) completed.

Georgia.—For the Forest Service, Chatsworth (Ga.-Tenn.) 15' quadrangle completed and Tamassée (S. C.-Ga.) 15' quadrangle begun. Coosa Bald, Cowrock, Jacks Gap, Mulky Gap, Neels Gap, Suches, and Tray Mountain 7½' quadrangles (T. V. A.) completed, and Noontootla and Wilsco 7½' quadrangles (T. V. A.) begun.

Idaho.—At the request of the Office of Indian Affairs, Pocatello, 15' quadrangle completed and Pauline 15' quadrangle begun. In preparation for geologic mapping, Big Creek and Yellow Pine 15' quadrangles and Wallace special area, sheets Nos. 2, 3, and 4 completed and sheet No. 1 begun. For the Forest Service, Headquarters 15' quadrangle begun. Landmark Rock 15' quadrangle (P. W.) begun.

Illinois.—Alto Pass, Casey, Lena, Monticello, and New Douglas 15' quadrangles completed; Ina and Mulberry Grove 15' quadrangles continued and Freeport 15' quadrangle begun in cooperation with the Department of Registration and Education of Illinois, Geological Survey.

Indiana.—In cooperation with the Department of Conservation of Indiana, Charlestown, Jeffersonville, New Albany, Owen, and Speed 7½' quadrangles completed and Bethlehem, Borden, Clear Lake, Coal City, Georgetown, Linton, and Switz City 7½' quadrangles begun.

Kansas.—In cooperation with the Geological Survey of Kansas, Altoona 15' quadrangle begun and Fredonia 15' quadrangle completed.

Louisiana.—In cooperation with the United States Army Engineer of the first New Orleans district, mapping with contours completed for Belle Chasse and Delacroix 7½' quadrangles and Hahnville, New Orleans, and Thibodaux 15' quadrangles. In cooperation with the Louisiana Board of State Engineers, mapping without contours from aerial photographs completed for Aloha, Bellwood, Bermuda, Clear Lake, Cloutierville, Coldwater, Coochie Brake, Creston, Cypress,

Flatwoods, Gorum, Grappes Bluff, Hagewood, Montgomery, Natchitoches, Powhatan, St. Maurice, and Verda 7½' quadrangles, and Hemphill Creek and Temple 7½' quadrangles begun.

Massachusetts.—In cooperation with the Department of Public Works, Division of Waterways, Assawompset Pond, Colrain, Leicester, Mount Grace, Orange, Paxton, Plympton, Sandwich, Shelburne Falls, Snipatuit Pond, Southwick, and Woronoco 7½' quadrangles completed; Hampden, Ludlow, Medfield, Sterling, and Wrentham 7½' quadrangles begun. Pawtucket (R. I.-Mass.) 7½' quadrangle (P. W.) begun.

Michigan.—In cooperation with the State Highway Department of Michigan, mapping with contours completed for Adair, Algonac, Goodells, Marine City, New Baltimore, Port Huron, St. Clair, St. Clair Flats, and Smiths Creek 7½' quadrangles; Rattle Run 7½' quadrangle begun; mapping without contours from aerial photographs completed for Dearborn, Detroit, Highland Park, and Royal Oak 7½' quadrangles. In cooperation with the Department of Conservation of Michigan, mapping without contours from aerial photographs begun for Ballentine 15' quadrangle.

Missouri.—In cooperation with the Geological Survey and Water Resources of Missouri, mapping with contours completed for Exeter, Fristoe, Knoblick, Middlebrook, Ozark, Silex, and Vienna 15' quadrangles and Butler, Fletcher, Galloway, Horton, New Home, Pacific, Tiff, Weldon Springs, and West Plains No. 1 7½' quadrangles; Cabool, Fordland, Gatewood, Long Lane, Noel, and Topaz 15' quadrangles continued; Linneus, Lupus, Rothville, and Vera 15' quadrangles and Eureka, Metz, Monegaw Springs, Moundville, Osceola, Roscoe, and Worland 7½' quadrangles begun; mapping without contours from aerial photographs completed for Green Ridge, Nelson, Smithton, and Sweet Springs 15' quadrangles and Sedalia and Sedalia West 7½' quadrangles.

Montana.—For the National Park Service, revision of Glacier National Park begun. In preparation for geologic mapping, Little Rocky Mountains area begun. At the request of the Forest Service, Mount Cowen and Mount Wallace 15' quadrangles begun. Gallup City 15' quadrangle (P. W.) completed.

Nebraska.—In preparation for geologic mapping, Republican River, sheet No. 1, Hardy to Beaver Creek and sheet No. 4, Vining Creek to Alma completed and sheets Nos. 2, 3, and 5 begun.

Nevada.—In preparation for geologic mapping, Austin mining area and Mineral Hill 15' quadrangle completed and Cortez 15' quadrangle begun. For the Forest Service, Owyhee 15' quadrangle begun.

New Jersey.—Patterson 7½' quadrangle (P. W.) completed.

New Mexico.—For the Forest Service, Jemez Springs 15' quadrangle completed. In preparation for geologic mapping, Oil City 15' quadrangle completed and Hackberry Lake 15' quadrangle begun. Carrizozo 15' quadrangle (P. W.) completed.

New York.—In cooperation with the Department of Public Works of New York, Nyack 7½' quadrangle completed and East Syracuse and Haverstraw 7½' quadrangles begun.

North Carolina.—Andrews, Marble, and Peachtree 7½' quadrangles (T. V. A.) completed.

North Dakota.—Heart Butte 15' quadrangle (P. W.) completed and Aylmer 15' quadrangle (P. W.) begun.

Oregon.—At the request of the Forest Service, Mapleton 15' quadrangle completed and Earl 15' quadrangle resumed.

Pennsylvania.—In cooperation with the Department of Internal Affairs of Pennsylvania, Topographic and Geologic Survey, Allentown West, Millheim, and Waterville 15' quadrangles completed and Mifflinburg 15' quadrangle begun.

Puerto Rico.—In cooperation with the Commissioner of the Department of the Interior of Puerto Rico, Aguadilla, Isabela, Moca, and Quebradillas 7½' quadrangles completed; Alto Sano, Camuy, and San Sebastian 7½' quadrangles begun.

Rhode Island.—Pawtucket (R. I.-Mass.) 7½' quadrangle (P. W.) begun.

South Carolina.—For the Forest Service, Tamasee (S. C.-Ga.) 7½' quadrangle begun.

Tennessee.—For the Forest Service, Chatsworth (Ga.-Tenn.) 15' quadrangle completed. Bean Station, Caney Creek, Joppa, Luttrell, Mascot, Talbott, and Bristol and Holston Valley (Tenn.-Va.) 7½' quadrangles (T. V. A.) completed; Avondale, Benton, Clevenger, New Market, and Parkville 7½' quadrangles (T. V. A.) begun.

Texas.—Winona 15' quadrangle (P. W.) completed. In preparation for geologic mapping, Turkey Mountain 15' quadrangle begun.

Utah.—For the Forest Service, Delano Peak 15' quadrangle and Marysville and vicinity completed and Beaver 15' quadrangle begun. In preparation for geologic mapping, Bull Valley area begun.

Vermont.—In cooperation with the State geologist of Vermont, Barnet 15' quadrangle continued.

Virginia.—Curles Neck and Richmond South 7½' quadrangles and Middletown and Winchester 15' quadrangles completed; Front Royal, Hightown, and Rustburg 15' quadrangles and Hopewell 7½' quadrangle begun in cooperation with the Conservation and Development Commission of Virginia, Geological Survey. Wallace, Wyndale, and Bristol and Holston Valley (Tenn.-Va.) 7½' quadrangles (T. V. A.) completed and Hilton and Mendota 7½' quadrangles (T. V. A.) begun.

Washington.—For the Forest Service, Dayton 30' quadrangle completed.

Wisconsin.—In cooperation with the State Highway Commission of Wisconsin, mapping with contours of Maiden Rock 15' quadrangle begun and mapping without contours from aerial photographs begun for Bessemer, Lac Du Flambeau, Minocqua, and Winchester 15' quadrangles.

Wyoming.—At the request of the Forest Service, Moccasin Lake 15' quadrangle completed and Mount Bonneville 15' quadrangle begun.

WATER-RESOURCES BRANCH

The importance of water and of systematic records related to the quantity, chemical quality, and availability of both surface and ground waters becomes increasingly greater each year. The growth of the country in population and industry, with consequent increases in demands for water, and especially the continued series of dry years that included the disastrous and widespread droughts of 1934 and 1936, and the many recent disastrous floods in different parts of the country, have impressed on the people the controlling importance of water in surface streams and in underground basins in relation to many of man's activities. The information collected by the Geological Survey is used extensively by many Federal, State, and private agencies. The Public Works Administration, the National Resources Committee, and related activities have found the Survey records and information with respect to water to be invaluable in studies of projects of all classes and in all sections of the country.

Reliable information with respect to supplies of water, both on the surface and in the ground, and to their fluctuations with variations in rainfall is essential to orderly, sound, and economic development along many lines, as in domestic water supplies, irrigation, flood protection, control of pollution, recreational uses, water-power development. The work of the water-resources branch thus occupies a position of great importance in the economic affairs of the Nation.

The investigations by the branch are conducted largely in cooperation with Federal bureaus; State, county, municipal, and other governmental agencies; and permittees and licensees of the Federal Power Commission. A major part of this cooperation is set forth below.

Federal bureaus.—Water resources investigations were conducted for the following Federal bureaus: The Bureau of Biological Survey, the Soil Conservation Service, and the Weather Bureau of the Department of Agriculture; the Office of Indian Affairs, the Bureau of Reclamation, and the National Park Service of the Department of the Interior; the Bureau of Prisons of the Department of Justice; the Department of State; the Federal Power Commission; the National Resources Committee; the Tennessee Valley Authority; the Office of Chief of Engineers, the Mississippi River Commission, and the Schofield Barracks of the War Department; and the Bureau of Naval Ordnance of the Navy Department.

States.—Amounts aggregating approximately \$806,000 were made available by States and municipalities for cooperative water-resources investigations. In addition to the data obtained as a result of this cooperation, other data having an estimated value of over \$133,000 were furnished by individuals and other organizations.

Permittees and licensees of the Federal Power Commission.—At the request of the Federal Power Commission, 30 engineers of the branch have been designated as representatives of the Commission to perform such field work as may be assigned to them by the Commission. The operation of about 295 gaging stations was conducted by the branch or was performed by permittees and licensees under the supervision of the branch in connection with 115 projects of the Federal Power Commission. Engineers of the branch have had field supervision of operation under permits and licenses of the Federal Power Commission in connection with 155 projects.

Division of Surface Water.—The division of surface water conducts investigations of surface water, which consist of the measurement of the flow of rivers in all the States, the District of Columbia, and Hawaii at selected gaging stations where the volume of water is measured and records of stage and other data are collected. In this work 46 States, the Territory of Hawaii, several Federal bureaus, and several individuals cooperated in the maintenance of the 3,831 gaging stations (of

which 2,616 are equipped with water-stage recorders) that were in operation at the end of the year. Records for about 113 additional gaging stations were received from Federal bureaus and from individuals. There were 46,832 regular and 5,024 miscellaneous discharge measurements made during the year.

Division of Ground Water.—The division of ground water investigates the waters that lie below the surface, in the zone of saturation, from which wells and springs are supplied; the source, occurrence, quantity, and head of these waters; their conservation; their availability and adequacy for domestic, industrial, irrigation, and public supplies and as watering places for livestock and desert travelers; and the methods of constructing wells and recovering water from them and of improving springs. The constantly increasing use of water supplies from wells is causing a greater demand each year for intensive studies of the quantities of ground water that are perennially available. Work was done in 34 States and in Guam, Hawaii, and the District of Columbia, nearly all in cooperation with Federal, State, Territorial, or local governmental agencies.

During the year about 100 technical reports or papers relating to ground water or reservoir sites were released to the public in printed, mimeographed, or typewritten form. Of special interest are the comprehensive report on more than 1,000 thermal springs in the United States (Water-Supply Paper 679-B), and the paper entitled "Some problems relating to legal control of use of ground waters," which was presented at the annual meeting of the American Water Works Association and published in the journal of that association. The report on water levels and artesian pressures in observation wells in different sections of the country in the calendar year 1937 is in press as Water-Supply Paper 840. A comprehensive paper on methods for determining the permeability of water-bearing material is in preparation.

Division of Quality of Water.—The division of quality of water analyzes water from surface and underground sources with reference to the suitability of the waters for industrial and agricultural uses and for domestic use (not related to questions of health) so far as such use is affected by the dissolved mineral matter. Analyses (partial or complete) of 2,474 samples of water from surface and underground sources were made in the laboratory in Washington, D. C., during the year. The analyses included some for many of the studies of ground water in the different States and for most of the special investigations on water supplies for specific projects. Close cooperation was continued with the division of ground water in the study of problems relating to quality of ground water and the preparation of the parts of ground-water reports that involve consideration of the chemical

character of the waters. During the year the sections in five ground-water reports concerning quality of water were reviewed.

Studies of suspended and dissolved matter of the Colorado River and its tributaries were continued. The unpublished analyses for the different gaging stations through September 30, 1937, were tabulated and the tables made available for public inspection in Washington, D. C., and in five of the Survey district offices in or near the Colorado River Basin.

Studies of silt movement on seven demonstration projects of the Soil Conservation Service of the Department of Agriculture, which were started as Federal Project 180 under an allocation of Public Works funds to the Survey, were continued. Summary reports of the results obtained from the beginning of the work through September 30, 1936, were prepared and transmitted to the Soil Conservation Service. The reports contain analyses of the records and recommendations for modifications of the work.

During the year water analyses were made for the Conservation Branch and the Geologic Branch of the Survey, for the Office of Indian Affairs and the National Park Service of the Department of the Interior, for the Department of Agriculture, for the Bureaus of Construction and Repair and of Yards and Docks of the Navy Department, for the Public Health Service of the Treasury Department, for the Architect of the Capitol, and for the government of the District of Columbia.

During the year five papers were presented by members of the division before educational, industrial, and scientific organizations.

Division of Power Resources.—The work of the division of power resources consisted of the compilation by States of information as to the capacity of water wheels in water-power plants of 100 horsepower or more as of January 1, 1938, on the basis of reports prepared by the Geological Survey's district engineers, thus providing a readily accessible file of information of developed water-power plants in the United States.

Assistance was furnished the Federal Power Commission in the preparation of a preliminary report on the use of power and its relation to water-power and fuel reserves requested by the President.

Copies of published reports and references to published articles and reports on water power and allied subjects were compiled and furnished to the chairman of the committee preparing a report on the Nation's energy resources, their prudent utilization and conservation, and their competitive relation to each other and to the economic structure, requested by the President.

A study is in progress and will be concluded in the fiscal year 1939 of the changes in the number, average capacity, average annual out-

put, and average use factor of privately and publicly owned electric public-utility power plants, based on records from 1920 to 1936.

Division of Water Utilization.—The division of water utilization investigates problems of the utilization and control of the waters of streams and under the administration of the Conservation Branch performs work relating to supervision and investigation of these problems and to activities pertaining to power projects of the Federal Power Commission and of the Department of the Interior as conducted by the field organization of this branch.

During the year the division has continued the investigations of water problems along the international boundary between the United States and Canada for the State Department and International Joint Commission. It has also continued the supervision and coordination of the collection by the district offices of the division of surface water of special stage and discharge information relative to recent outstanding floods. Water-supply papers, including these special flood data with reference to the floods of January–February 1937 in the Ohio and Mississippi Basins, the flood of May–June 1937 in New Mexico, and the floods of the winter of 1937–38 in California, have been submitted for printing or are in process of preparation.

The division is conducting studies of the relations of rainfall, runoff, and other hydrologic factors to develop fundamental information concerning the runoff characteristics of drainage areas and river systems. Such studies may be useful in appraising the practicability of flood control and water conservation by construction of reservoirs, by the proper use of land, and by other means, and in promoting better knowledge of the adequacy of available water supplies for various kinds of use.

The Water-Resources Branch is the authoritative collector of basic information regarding the stages and discharges of the rivers of the country. The interpretations by this division of data accumulated incidentally in the course of the peculiarly wide yet close study of the behavior of rivers and of such hydrologic phenomena as floods and droughts are a notable contribution to a body of scientific knowledge that will have wide practical applications.

WORK OF THE YEAR BY STATES

The stream-gaging stations listed under the different States are operated in part with funds appropriated to the Geological Survey, in part with funds furnished by States and municipalities in cooperation with the Geological Survey, and in part with funds furnished by other Federal bureaus.

Alabama.—Surface-water investigations were continued in cooperation with the State Geologist, and 43 gaging stations were operated. Funds were also contributed by the Mobile Army Engineer office and licensees of the Federal Power

Commission. Preliminary tests were made of 143 samples of well water from Coffee County in connection with a study of tuberculosis by the Public Health Service of the Treasury Department.

Alaska.—Analyses were made of two water samples from Mount McKinley National Park, and suggestions were made to the National Park Service in regard to treatment of the waters for hotel use.

Arizona.—Surface-water investigations were continued in cooperation with the State Water Commission, the State Water Conservation District, and the Salt River Valley Water Users' Association, and 50 gaging stations were operated. Funds were also contributed by the Federal Court Water Commissioner on the Gila River, the Bureau of Reclamation, and the Office of Indian Affairs. Reports on ground water in the Avra-Altar Valley and parts of the Gila and San Simon valleys were published as Water-Supply Papers 796-E and 796-F, and a report on ground water in the Holbrook region is in press as Water-Supply Paper 836-B. Analyses were made of 10-day composites of daily samples collected throughout the year from the Colorado River at Grand Canyon and at Willow Beach. The silt load was measured daily at gaging stations at both places. Samples from three springs near Tonto National Bridge, 5 miles south of Pine, were analyzed for the National Park Service.

Arkansas.—Surface-water investigations were continued in cooperation with the State Geologist and the State Highway Commission, and 32 gaging stations were operated. Funds were also contributed by the Little Rock Army Engineer office, the Weather Bureau, and licensees of the Federal Power Commission. Through cooperation with the State Agricultural Experiment Station the study of the annual pumpage and resultant fluctuations in ground-water levels was continued.

California.—Surface-water investigations were continued in cooperation with the State Department of Public Works, the Metropolitan Water District of Southern California, the East Bay Municipal Utility District, the Santa Clara Valley Conservation District, Stanford University, the cities of San Diego, San Luis Obispo, Santa Barbara, and Santa Cruz, and the counties of Los Angeles, Riverside, San Bernardino, Ventura, and Orange, and 284 gaging stations were operated. Funds were also contributed by the Bureau of Reclamation, and licensees of the Federal Power Commission. Water levels were measured in observation wells in different areas. The record for some wells now covers a period of 34 years. Tests were made for the Office of Indian Affairs of three samples from Agua Caliente Hot Springs near Palm Springs.

Colorado.—Surface-water investigations were continued in cooperation with the State Engineer, and 187 gaging stations were operated. A report on the artesian basin of the San Luis Valley was published as a part of the report on the Rio Grande Joint Investigation. Partial analyses were made of daily samples and composites of daily samples collected from the Colorado River at Grand Junction and from the Gunnison River at Grand Junction.

Connecticut.—Surface-water investigations were continued in cooperation with the State Water Commission, the cities of Hartford and New Britain, and 35 gaging stations were operated. In cooperation with the State Water Commission, and through the aid of a W. P. A. project, extensive records were obtained of water levels in observation wells and of the salt content of the water in wells near the coast. Field, laboratory, and office work were supervised for a W. P. A. project on the salinity of the Connecticut River, including the direction of the preparation of a report (nearly completed) based on about 150,000 determinations of chloride in samples collected since the initiation of the project in 1934.

Cuba.—Three samples of surface water from near Guantanamo were analyzed for the Bureau of Yards and Docks of the Navy Department with reference to the treatment of the water for a supply for the Naval Station.

District of Columbia.—Ground-water investigations were continued with special reference to pumpage and water levels. Analyses were made of a sample from a new well of the Department of Agriculture and of a sample from the Anacostia River at the intake entrance to the United States Capitol power pump house. Three samples for analyses were collected from wells at the District Training School at Laurel, Md., and recommendations made as to the treatment of the water.

Florida.—Surface-water investigations were continued in cooperation with the State Road Department, Okeechobee Flood Control District, and the cities of Jacksonville and Tampa, and 47 gaging stations were operated. Funds were also contributed by the Jacksonville Army Engineer office, and permittees of the Federal Power Commission. Ground-water investigations were continued in cooperation with the State Geological Survey. Progress was made on the report on the area west of the Suwannee River, and studies were begun in the Jacksonville area, where the rate of pumping for industrial purposes has recently been greatly increased.

Georgia.—Surface-water investigations were continued in cooperation with the State Department of Natural Resources, and 53 gaging stations were operated. Funds were also contributed by the Mobile Army Engineer office and permittees of the Federal Power Commission. A report on the warm springs of the State was published as Water-Supply Paper 819. Analyses were made of 10-day composites of daily samples collected at six gaging stations. Single samples from rivers at other gaging stations were analyzed, and samples were collected from 60 public water supplies, most of which were analyzed before the end of the year. Daily samples were collected at seven points on the Savannah River for the study of salinity.

Guam.—A report on the ground-water resources of the Island of Guam was transmitted to the Secretary of the Navy.

Hawaii.—Surface-water and ground-water investigations were continued in cooperation with the Territory of Hawaii, and a total of 118 gaging stations were operated on the islands of Kauai, Oahu, Molakai, Maui, and Hawaii. Several ground-water reports were released during the year. A study of the availability of geophysical methods in the ground-water work of the islands was undertaken in cooperation with the geophysical section of the geologic branch of the Survey. A report containing a detailed geologic map of Oahu is in press as Bulletin 2 of the Territorial Division of Hydrography, and a report giving the records of the wells on Oahu is in press as Bulletin 4. Reports on the ground water in Maui and Molakai are in preparation.

Idaho.—Surface-water investigations were continued in cooperation with the State Department of Reclamation and the State Water Conservation Board, and 293 gaging stations in Idaho and 2 in British Columbia were operated. Funds were also contributed by the Department of State. Comprehensive reports on the ground water in the Snake River Plain and in the Mud Lake region are in press as Water-Supply Papers 774 and 818. Water-level measurements were made in cooperation with the Soil Conservation Service.

Illinois.—Surface-water investigations were continued in cooperation with the State Department of Registration and Education, and 45 gaging stations were operated. Funds were also contributed by the Rock Island Army Engineer office.

Indiana.—Surface-water investigations were continued in cooperation with the State Department of Public Works and the city of Indianapolis, and 34 gaging stations were operated. Ground-water investigations were continued in cooperation with the State Division of Geology in the State-wide observation-well program, and special attention was given to the Indianapolis area.

Iowa.—Surface-water investigations were continued in cooperation with the State Geological Survey and the State Institute of Hydraulic Research, and 51 gaging stations were operated. Funds were also contributed by the Rock Island Army Engineer office. Investigations were continued in cooperation with the Soil Conservation Service in a study of the effects of soil conservation measures on the ground-water levels.

Kansas.—Surface-water investigations were continued in cooperation with the State Board of Agriculture, and 52 gaging stations were operated. Funds were also contributed by the Kansas City and Little Rock Army Engineer offices and the Soil Conservation Service. A State-wide study of ground-water resources was started in cooperation with the State Geological Survey. Most of the work was done in the area occupied by the *Equus* beds, with special reference to an improved water supply for Wichita. A preliminary report on the ground-water supplies available for irrigation in Ford County was published by the University of Kansas. The program of water-level measurements in the vicinity of Mankato was continued in cooperation with the Soil Conservation Service. During the year 666 samples for determination of the silt load were collected from four streams at points near Ionia and Jewell. The work on silt movement on the Soil Conservation Service project at Mankato was discontinued on June 30.

Kentucky.—Surface-water investigations were inaugurated on April 1 in cooperation with the State Department of Highways, and 32 gaging stations were being operated at the end of the year.

Louisiana.—Surface-water investigations were continued in cooperation with the State University, and 3 gaging stations were operated. Funds were also contributed by the Mississippi River Commission. Cooperation was started with the State Geological Survey in a systematic State-wide investigation of the ground-water resources, the first work being done in Rapides Parish.

Maine.—Surface-water investigations were continued in cooperation with the State Public Utilities Commission, and 33 gaging stations were operated.

Maryland.—Surface-water investigations were continued in cooperation with the State Geologist, the Washington Suburban Sanitary District, and the cities of Baltimore and Salisbury, and 26 gaging stations were operated. An intensive study was made for the Navy Department as to the quantity of ground water available in the vicinity of Indian Head.

Massachusetts.—Surface-water investigations were continued in cooperation with the State Department of Public Works, the State Metropolitan District Commission, the State Metropolitan District Water Supply Commission, and the State Department of Public Health, and 35 gaging stations in Massachusetts and 1 in Rhode Island were operated.

Michigan.—Surface-water investigations were continued in cooperation with the State Stream Control Commission, and 48 gaging stations were operated. Ground-water investigations were continued in cooperation with the State Geological Survey. All records obtained for observation wells since the beginning of the project in 1932 were prepared for publication.

Minnesota.—Surface-water investigations were continued in cooperation with the State Division of Drainage and Waters, and 212 gaging stations were operated. Funds were also contributed by the Department of State, the St. Paul Army Engineer office, and the Biological Survey.

Mississippi.—Surface-water investigations were continued in cooperation with the State Geological Survey, and 9 gaging stations were operated. Funds were also contributed by the Mississippi River Commission.

Missouri.—Surface-water investigations were continued in cooperation with the State Geological Survey, the State Highway Department, the State Park Department, and the cities of Joplin and Springfield, and 94 gaging stations were

operated. Funds were also contributed by the Kansas City and St. Louis Army Engineer offices and the Soil Conservation Service. The observation-well program in the Tarkio area was continued in cooperation with the Soil Conservation Service. During the year 3,590 samples from streams in and near the Tarkio and Bethany projects of the Soil Conservation Service were examined for silt content.

Montana.—Surface-water investigations were continued in cooperation with the State Engineer, and 147 gaging stations were operated. Funds were also contributed by the Department of State, the Kansas City Army Engineer office, and permittees of the Federal Power Commission. A report based on a 10-year record was released concerning the effects of the proposed storage in Flathead Lake on the ground-water levels at the head of the lake.

Nebraska.—Surface-water investigations were continued in cooperation with the State Engineer, and 59 gaging stations were operated. Ground-water investigations were continued in cooperation with the State Water Survey Department. The State-wide observation-well program was continued. The report on the geology and ground-water resources of south-central Nebraska, with special reference to the Platte River Valley between Chapman and Gothenburg, was published as Water-Supply Paper 779. Reports on the ground-water conditions in Keith County and in the Grand Island area were prepared, and work was started in Box Butte County.

Nevada.—Surface-water investigations were continued in cooperation with the State Engineer, and 11 gaging stations were operated.

New Hampshire.—Surface-water investigations were continued in cooperation with the State Water Resources Board, and 29 gaging stations were operated.

New Jersey.—Surface-water investigations were continued in cooperation with the State Water Policy Commission, the North Jersey District Water Supply Commission, and the Delaware River Joint Toll Bridge Commission, and 80 gaging stations were operated. Funds were also contributed by the New York Army Engineer office. Ground-water investigations were continued in cooperation with the State Water Policy Commission. The program of observation wells begun in 1923 was continued. A report on the water supplies from the No. 1 sand in the vicinity of Parlin was published by the State as Special Report No. 7.

New Mexico.—Surface-water investigations were continued in cooperation with the State Engineer, the Interstate Stream Commission, and the Middle Rio Grande Conservancy District, and 251 gaging stations were operated. Funds were also contributed by the Office of Indian Affairs. Ground-water investigations were continued in cooperation with the State Engineer and the Middle Rio Grande Conservancy District. Investigations were in progress in regard to the salt-water conditions in the Carlsbad area, the shallow ground waters in the Roswell Basin, and the ground-water conditions in the Middle Rio Grande area in relation to the surface water. A report on the ground-water conditions in the San Jose-Bluewater Valley was made for the Office of Indian Affairs. Reports on the origin of water in the Major Johnson Springs, near Carlsbad, and on the recharge of the shallow ground water in the Roswell Basin were released in typewritten form. Reports on geology and ground water were published as parts of the report on the Rio Grande Joint Investigation. Analyses were made of 186 samples from the Rio Grande and tributaries and of 426 samples from the Pecos River. In Roswell analyses were made of 10-day composites of daily samples from seven gaging stations.

New York.—Surface-water investigations were continued in cooperation with the State Department of Conservation, the State Water Power and Control Commission, the State Department of Public Works, the Black River Regulating District, the Hudson River Regulating District, the Oswegatchie River Improve-

ment Commission, the cities of Albany and Jamestown, the New York City Board of Water Supply, the Village of Ossining, and Nassau County, and 149 gaging stations were operated. Funds were also contributed by the Binghamton-Pittsburgh, and New York Army Engineer offices. Ground-water investigations were continued in cooperation with the State Water Power and Control Commission and with Nassau and Suffolk Counties. Records of wells in Kings, Suffolk, Nassau, and Queens Counties were published by the State as Bulletins GW-3, GW-4, GW-5, and GW-6. A report on the water supply of Shelter Island was released, and a study was made of the underflow of the Croton Valley below the dam. Papers on the methods used in the Croton investigation and on the return of ground water used in air conditioning and resultant temperature effects were presented for publication by the American Geophysical Union.

North Carolina.—Surface-water investigations were continued in cooperation with the State Department of Conservation and Development, and 96 gaging stations were operated. Funds were also contributed by the Tennessee Valley Authority, the Soil Conservation Service, and permittees of the Federal Power Commission. Ground-water investigations were continued in cooperation with Elizabeth City in a study of methods for overcoming the clogging of well screens. The collection of water-level measurements in wells has been continued. During the year 2,644 samples were collected for determination of silt in four streams near High Point, in connection with the operation of the Soil Conservation Service demonstration project.

North Dakota.—Surface-water investigations were continued in cooperation with the State Engineer, and 29 gaging stations were operated. Ground-water investigations were continued in cooperation with the State Geological Survey in a study of the Dakota artesian basin and the establishment of a State-wide observation-well program.

Ohio.—Surface-water investigations were continued in cooperation with the Miami Conservancy District, the Muskingum Watershed Conservancy District, and the city of Columbus, and 62 gaging stations were operated. Funds were also contributed by the Cincinnati, Huntington, and Pittsburgh Army Engineer offices. An investigation of ground-water supplies of Butler and Hamilton Counties, in the Cincinnati area, was continued in cooperation with those counties. A study was also made of pumpage from wells in the vicinity of Canton.

Oklahoma.—Surface-water investigations were continued in cooperation with the State Planning and Resources Board and Oklahoma City, and 27 gaging stations were operated. Funds were also contributed by the Soil Conservation Service, and the Little Rock Army Engineer office. Ground-water investigations in cooperation with the State Geological Survey were started, the first unit project being an investigation of Texas County with special reference to ground-water supplies available for irrigation. Water-level measurements were made in the Stillwater area of the Soil Conservation Service. During the year 228 samples were collected for determination of silt in three streams near Stillwater, Okla., in connection with the Soil Conservation Service demonstration project at Stillwater. The silt measurements were discontinued December 31, 1937. Partial analyses were made of 64 samples from wells near Ponca City in connection with a study of the pollution of ground water by waste from oil refinery operations. Analyses were made of six samples of ground and pond water used at zinc mines and mills.

Oregon.—Surface-water investigations were continued in cooperation with the State Engineer and the cities of McMinnville and Portland, and 200 gaging stations were operated. Funds were also contributed by the Portland Army Engineer office, the Biological Survey, and permittees of the Federal Power Commission. Ground-water investigations were continued on several projects in coopera-

tion with the State Agricultural Experiment Station and the State Water Resources Department. A report was released on water for domestic use in Columbia County. Reports were completed on the geologic features of the dam sites in the basins of the Nehalem, Rogue, and Willamette Rivers. Analyses were made for the National Park Service of two samples of water from Oregon caves.

Pennsylvania.—Surface-water investigations were continued in cooperation with the State Department of Forests and Waters and the city of Harrisburg, and 107 gaging stations were operated. Funds were also contributed by the Pittsburgh Army Engineer office, and permittees of the Federal Power Commission. Ground-water investigations were continued in cooperation with the State Topographic and Geologic Survey. The report on northeastern Pennsylvania was published by the State as Bulletin W-4, the report on south-central Pennsylvania is in press as Bulletin W-5, and the report on north-central Pennsylvania was completed and released in typewritten form. The collection of water-level data was continued.

South Carolina.—Surface-water investigations were continued in cooperation with the State Highway Department, the city of Spartanburg, and the town of Duncan, and 23 gaging stations were operated. Funds were also contributed by the Soil Conservation Service. The study of ground-water levels in the Tyger River area of the Soil Conservation Service was continued. During the year 8,532 samples were examined for silt content, and three gaging stations were maintained on North and South Tyger Rivers, in connection with the operation of the Soil Conservation Service demonstration project at Spartanburg. This work on the project was discontinued June 30.

South Dakota.—Surface-water investigations were continued in cooperation with the Kansas City Army Engineer office and the Biological Survey, and 21 gaging stations were operated. A report on the ground-water levels near Huron in 1937 was included in Water-Supply Paper 840.

Tennessee.—Surface-water investigations were continued in cooperation with the State Division of Geology, and 101 gaging stations were operated. Funds were also contributed by the Tennessee Valley Authority and the Nashville Army Engineer office. Records were obtained as to the pumpage and water levels in wells in Memphis. Preliminary tests were made of 216 samples of well waters from Giles County in connection with a study, by the Public Health Service of the Treasury Department, of tuberculosis in that county.

Texas.—Surface-water investigations were continued in cooperation with the State Board of Water Engineers, and 93 gaging stations were operated. Funds were also contributed by the Little Rock Army Engineer office. An extensive program of ground-water investigations was continued in cooperation with the State Board of Water Engineers and the cities of Big Spring, El Paso, Houston, and Lufkin. Intensive investigations were continued in the High Plains. A report on methods of locating salt-water leaks in water wells was published as Water-Supply Paper 796-A, and a report on ground water in Webb County was published as Water-Supply Paper 778. Mimeographed or typewritten reports were released on the ground-water resources of the Balmorhea, Lufkin, and Bryan areas and on the effects of pumping on water levels in the Houston area. Mimeographed reports were issued, giving the results of the W. P. A. water-well and spring inventories in the counties of Wilson, Ector, Dallam, Comal, Burleson, Brazoria (west of the Brazos River), Smith, Rusk, Lubbock, Leon, Karnes, Guadalupe, Lee, Knox, Glasscock, Andrews (south half), Eastland, Lamb, Potter, Midland, Randall, Austin, Coleman, Shelby, Colorado, Hale, Swisher, Parnet, Panola, Refugio and part of Goliad, Brown, De Witt, and Floyd. A study was begun of the ground waters in the coastal sand-dune region. A substantial contribution in regard to the water levels in observation wells throughout Texas

was included in Water-Supply Paper 840. During the year 181 samples of water were analyzed.

Utah.—Surface and ground-water investigations were continued in cooperation with the State Engineer, and 71 gaging stations were operated. Special attention was given to the fluctuations of water levels with precipitation and pumpage or artesian flow and to the effects of the conservation program administered by the State Engineer. A report on the geology and ground-water resources of Ogden Valley was published as Water-Supply Paper 796-D. A report on the artesian water levels and interference between artesian wells in the vicinity of Lehi is ready to be published. Analyses were made of 36 composites of daily samples from the San Juan River near Bluff. The silt load was measured daily. Partial analyses were made of daily samples and of composites of daily samples collected throughout the year from the Colorado River at Cisco and the Green River at Green River.

Vermont.—Surface-water investigations were continued in cooperation with the State, and 27 gaging stations were operated.

Virginia.—Surface-water and ground-water investigations were continued in cooperation with the State Commission on Conservation and Development, and 89 gaging stations were operated. Funds were also contributed by the Huntington Army Engineer office. Work was done and a report released on artesian water in Southampton, Sussex, and Isle of Wight Counties. The observation-well program near Washington, D. C., which was begun in 1928, was continued.

Washington.—Surface-water investigations were continued in cooperation with the State Department of Conservation and Development, the Inter County River Improvement Commission, the cities of Aberdeen, Everett, Seattle, and Tacoma, and Skagit and Whatcom Counties, and 104 gaging stations in Washington and 5 in British Columbia were operated. Funds were also contributed by the Department of State, the Bureau of Reclamation, the Office of Indian Affairs, the Soil Conservation Service, and permittees of the Federal Power Commission. Ground-water investigations were begun in cooperation with the State Department of Conservation and Development and the city of Tacoma. A progress report on the Tacoma area was released and work was started in the Spokane Valley. Records were obtained on observation wells in the State-wide program and in the Pullman area of the Soil Conservation Service. During the year 4,946 samples were examined for silt content from six points on streams in and near the Pullman demonstration area.

West Virginia.—Surface-water investigations were continued in cooperation with the State Geological Survey, the State Public Service Commission, and the State Water Commission, and 46 gaging stations were operated. Funds were also contributed by the Huntington and Pittsburgh Army Engineer offices and permittees of the Federal Power Commission.

Wisconsin.—Surface-water investigations were continued in cooperation with the State Public Service Commission and the State Statutory Commission on Water Pollution, and 84 gaging stations were operated. Funds were also contributed by the Biological Survey, the Soil Conservation Service, the St. Paul Army Engineer office, and permittees of the Federal Power Commission. Records of water levels in observation wells were obtained in cooperation with the State Conservation Department and with the assistance of the Soil Conservation Service. During the year 2,434 samples from streams near LaCrosse were examined for silt content in connection with the operation of the LaCrosse demonstration project of the Soil Conservation Service.

Wyoming.—Surface-water investigations were continued in cooperation with the State Engineer, and 101 gaging stations were operated. Funds were also contributed by permittees of the Federal Power Commission.

CONSERVATION BRANCH

The work of the Conservation Branch involves surveys and investigations precedent to an inventory of the water and mineral resources of the public domain, supervision of private operations for development of power and production of minerals from public and Indian lands and naval petroleum reserves, and supplying information and advice to numerous land-administrative agencies of the Government.

These activities were maintained throughout the year, but not on the comprehensive and detailed basis that the work warranted, because of the lack of adequate funds. Mineral production during the year from public and Indian lands and naval petroleum reserves under supervision had an estimated value of \$88,500,000, and the revenue accrued therefrom amounted to about \$9,750,000. This substantial revenue is attributable both directly and indirectly to the supervision provided, the cost of which is meager compared with the income involved.

Cases pending in the branch at the end of the year decreased 16 percent, though the annual volume of work increased 72 percent, largely as the result of classification of the status of 7,697 oil and gas prospecting permits under the act of August 26, 1937, as required by Departmental Order No. 1240 of December 23, 1937. This work was accomplished by the assignment of a number of field engineers to Washington, with a consequent loss to field supervisory activities. Progress made on unit plans placed the work on a current basis at the end of the year. A total of 1,637 plans of development and operation were received during the year and at its close only eight of these were awaiting original technical consideration in the branch.

No expenditures were made from Public Works funds allotted for projects on which the several divisions of the branch had been engaged during the preceding year, and the unexpended balance of such funds was transferred back to the National Industrial Recovery fund on March 28, 1938.

MINERAL CLASSIFICATION DIVISION

The office activities of the mineral classification division were directed in considerable part to determining the areas subject to inclusion in plans for unit or cooperative development submitted by holders of Government oil and gas prospecting permits and leases and to consideration and submission of reports on initial applications for oil and gas leases.

In the aid of mineral classification pertinent information relating to the occurrence of carbon dioxide gas in Colorado; of coal in Montana, New Mexico, Oregon, Utah, and Wyoming; of oil and gas in Alabama, Colorado, Florida, Kansas, Louisiana, Mississippi, Montana, New Mexico, Oklahoma, South Dakota, Utah, and Wyoming; and of

phosphate in Florida, Idaho, and Wyoming was obtained either by the personnel of the mineral classification division or through the geologic branch.

In the routine work of the division 7,621 cases requiring technical consideration were disposed of during the fiscal year.

In addition to the preceding work, revision of the definition of the known geologic structure of one producing oil and gas field and the initial definition of another similar field were prepared and promulgated as follows:

Definitions of Known Geologic Structure, Fiscal Year 1938

State	Field	Date promulgated	Acres
Colorado.....	Moffat ¹	Dec. 17, 1937	4,357
Wyoming.....	Muskra ¹	Dec. 29, 1937	1,391

¹ Change in name.

The aggregate area of the outstanding definitions of the known geologic structure of oil and gas fields on June 30, 1938, amounted to 1,156,644 acres in California, Colorado, Montana, New Mexico, North Dakota, Oklahoma, Utah, and Wyoming.

WATER AND POWER DIVISION

The work of obtaining basic information as to the water-power resources and storage possibilities of public land and of making it available for use in the administration of public-land laws and by Federal and other agencies engaged in planning, constructing, and operating water-power projects was continued in the field, but on a small scale because of lack of funds. River utilization surveys covering 32 miles of streams and tributaries and detailed surveys at four dam sites were made. Surveys of mineral leaseholds embracing an area of 12.5 square miles were also completed. Work was continued in the office on the preparation of reports on geologic conditions at 61 dam sites examined in the field during the next preceding year.

Office activities included action resulting in the addition of 97,583 acres to outstanding water-power reserves in 9 public-land States and Alaska and the elimination of 5,890 acres from such reserves in 6 States, with a net increase of the total reserved area in 22 States and Alaska to 6,675,132 acres. The elimination of 1,995 acres from reservoir-site reserves left a net total of 131,499 acres withdrawn. Field supervision, with the Water Resources Branch, of power projects for the Federal Power Commission involved investigations and reports on 5 projects, supervision of construction and operation on 155 projects, and continuation of studies of cost accounting on 9 projects. Field supervision of power projects holding permits and grants from

the Department of the Interior involved 172 projects, making a total of 327 projects for the Department of the Interior and the Federal Power Commission.

Statistics compiled by the division show that the holders and users of rights-of-way granted by the Secretary of the Interior for power purposes had, for the calendar year 1937, an aggregate installed capacity of 5,278,764 horsepower, including 3,644,006 horsepower at hydraulic plants and 1,634,758 horsepower at fuel plants, and an aggregate energy generation of 14,040,649,490 kilowatt-hours, which is an increase of 22 percent over the production in the next preceding year. The energy generated by water power increased 2,124,816,095 kilowatt-hours, or about 21 percent, and that generated by fuel increased 447,452,772 kilowatt-hours, or about 32 percent. Revenues accruing to the Government from these grants aggregated \$249,025 from 1912 to 1937, and \$15,325 additional has been assessed for the calendar year 1938. Payments for unauthorized occupancy of public lands by power projects prior to the issuance of license therefor by the Federal Power Commission amount to \$104,667 additional.

MINING AND OIL- AND GAS-LEASING DIVISIONS

The work of the mining and oil- and gas-leasing divisions consists of inspectional and regulatory supervision of mineral prospecting and development on public land, Indian land, and naval petroleum reserves.

The mining division is charged with supervision of all operations for the discovery and development on public land of deposits of coal, potassium, sodium, phosphate, and oil shale; in New Mexico and Louisiana of sulphur; on certain land grants of gold, silver, and mercury; and on restricted allotted and tribal Indian lands of all minerals except oil and gas. This supervisory and regulatory work during the fiscal year was accomplished through six field offices at Denver, Colo.; Billings, Mont.; Carlsbad, N. Mex.; McAlester and Miami, Okla.; and Salt Lake City, Utah; and through a cooperative agreement approved May 4, 1935, with the Department of Mines, Territory of Alaska.

The work of the oil- and gas-leasing division includes inspectional and regulatory supervision of all operations for the discovery, development, and production of petroleum and natural gas on public land of the United States, on naval petroleum reserves, and on all Indian land subject to departmental jurisdiction, both tribal and allotted, except the Osage Reservation, Okla. The work was accomplished in the fiscal year 1938 through the agency of the 15 field offices and sub-offices at Taft, Calif.; Roswell and Farmington, N. Mex.; Tulsa, Oklahoma City, Holdenville, and Drumright, Okla.; Wichita Falls, Tex.; Denver, Colo.; Casper, Midwest, and Thermopolis, Wyo.;

Billings and Great Falls, Mont.; and Salt Lake City, Utah. During the year the territorial delineation of the three supervisory districts was changed and a fourth supervisory district created with headquarters at Roswell, N. Mex.

Public land.—The number of public-land properties under supervision of the mining division at the end of the fiscal year 1938 was 743, a decrease of 27 from June 30, 1937. Coal properties in 14 States and Alaska decreased 31, to 626; potash properties in 3 States decreased 5, to 34 in 2 States; sodium properties in 9 States increased 5, to 49 in 8 States; phosphate properties in 4 States decreased 4, to 7 in 3 States; sulphur properties in 1 State increased 9, to 27; and the 1 oil-shale lease was canceled. The reduction in coal properties resulted indirectly from the Secretary's instructions of January 24, 1934, and that in potash properties from the Secretary's order 914 of April 5, 1935. Senate Resolution 298, approved June 16, 1938, restricted further issuance of phosphate leases. In prospecting for the above-named minerals nine bore holes were drilled during the year.

Accidents to employees working in mines under departmental lease are generally fewer than in competitive mines not on Government land, and it is gratifying to note that of the 28 awards to coal mines by the Joseph A. Holmes Safety Association for the calendar year 1937, four were made to departmental lessees. The use of safety appliances and safety clothing is increasing generally throughout mines on Government land.

The number of public-land properties under supervision of the oil- and gas-leasing division decreased 4.9 percent to a total of 8,605, involving 11,749,396.98 acres in 18 States and Alaska.

A substantial part of the time of the personnel of the division was devoted to assisting oil and gas permittees in fulfilling departmental requirements for the submission of unit or cooperative plans of operation and development and to reviewing and revising the engineering and royalty features of such plans after their submission. Approximately 7,800 outstanding oil and gas prospecting permits were classified under the various extension provisions of the act of August 26, 1937 (50 Stat. 842). At the end of the fiscal year 1938 a total of 1,637 plans of unit or cooperative development for oil or gas pools, fields, or areas involving public land had been filed with the Geological Survey, of which 91 had been given final approval by the Secretary of the Interior, 1,492 had been rejected, withdrawn, or suspended, and 54 were pending final action, including 8 which were awaiting technical consideration in the Conservation Branch.

Drilling activity on public land during the fiscal year 1938 included the commencement of 362 new wells and the completion of 408 wells, of which 316 were rated as productive of oil and gas and 92 as barren.

The total number of wells under supervision on June 30, 1938, was 8,339, including 4,334 capable of oil or gas production. Production of petroleum from public land in 1938 was substantially greater than in other recent years; production of gas was approximately the same as in 1937; production of natural gasoline was substantially less than in other recent years.

Indian land.—The number of Indian-land properties under supervision of the mining division during the fiscal year was 235 in 9 States. These properties involved 44 lead and zinc leaseholds in the Quapaw Reservation, Okla., with aggregate royalty accruals of \$487,339.50, a decrease of 14.25 percent from the preceding year; 54 coal leaseholds on segregated Choctaw and Chickasaw land and restricted allotted land in Oklahoma, with an aggregate production, decreased from 527,579.75 tons in 1937 to 289,089.10 tons in 1938, and revenue accruals from royalties, bonuses, and sale of coal lands amounting to \$73,080.30; 1 asphalt lease on segregated land in Oklahoma; and 136 properties in 9 western States, of which 13 were agency coal mines, 12 coal lessees, 63 individual Indian coal mines, and 48 metalliferous leases and nonmetalliferous leases other than coal leases.

Oil and gas supervision involved 5,382 leaseholds, 4,407 wells, and aggregate bonus, royalty, and rental accruals estimated at \$2,500,000 for Indian beneficiaries in 11 States and 31 different tribes. The cooperative duties involved royalty accounting, appraisals of bonuses, royalty offers, and pollution damages, assistance to lessees of Indian land on operating problems and in the preparation of unit plans of development, and assistance to agency officials and tribal councils on technical phases of leasehold development and administration.

Naval petroleum reserves.—On behalf of the Navy Department supervision was continued during the fiscal year over operations for the production of oil and gas within Naval Petroleum Reserves Nos. 1 and 2, in California, and for the conservation of shut-in production within Naval Petroleum Reserve No. 3, in Wyoming. Production from 519 wells on the reserves aggregated 4,238,533.36 barrels of petroleum, 2,395,996,000 cubic feet of natural gas, and 10,581,504 gallons of natural gasoline and had an aggregate royalty value of \$1,020,444.84.

SUMMARY OF FIELD ACTIVITIES, BY STATES

Alabama.—Investigated oil and gas prospecting operations throughout the State in aid of mineral classification. Supervised one coal lease on public land.

Alaska.—Supervised 1 power project, 2 leases, 10 prospecting permits, and 4 licenses for coal, and 147 prospecting permits for oil and gas on public land..

Arizona.—Supervised 24 power projects, 3 prospecting permits for coal and 7 for sodium, 3 leases and 66 prospecting permits for oil and gas on public land, 7 Indian agency coal mines, and 11 asbestos leases and 1 gold lease on Indian land. Examined 3 vanadium lease applications on Indian land.

Arkansas.—Supervised 1 power project and 9 prospecting permits for oil and gas on public land.

California.—Supervised 92 power projects, 3 prospecting permits for coal and 27 for sodium, 1 sodium lease, 2 potash leases, and 240 leases and 1,037 prospecting permits for oil and gas on public land, 1 coal lease and 3 gold leases on Indian land, and 22 oil and gas leases on naval petroleum reserves.

Colorado.—Investigated occurrence of carbon dioxide gas in the Black Canyon area, Delta County. Supervised 16 power projects, 96 leases, 32 prospecting permits, 11 licenses, and 4 awarded lease applications for coal, 1 sodium lease, and 35 leases and 638 prospecting permits for oil and gas on public land, and 1 coal lease, 1 vermiculite lease, and 5 oil and gas leases on Indian land.

Florida.—Investigated phosphate and oil and gas prospecting operations throughout the State in aid of mineral classification. Examined one tract in Suwannee County, one tract in Glades County for purposes of mineral classification, and an area in Monroe County involving reported oil and gas occurrences.

Idaho.—In cooperation with the Geologic Branch initiated investigations of phosphate deposits in eastern Bonneville County. Supervised 40 power projects, 1 lease and 17 prospecting permits for coal, 2 phosphate leases, and 69 prospecting permits for oil and gas on public land.

Kansas.—Investigated oil and gas prospecting operations in western Kansas in aid of mineral classification. Supervised 5 leases and 18 prospecting permits for oil and gas on public land.

Louisiana.—Investigated oil and gas prospecting operations throughout the State in aid of mineral classification. Supervised 22 leases and 3 prospecting permits for oil and gas on public land.

Mississippi.—Investigated oil and gas prospecting operations throughout the State in aid of mineral classification. Supervised 1 power project and 1 lease for oil and gas on public land.

Montana.—For the Office of Indian Affairs examined a location in Flathead River, near Polson, Mont., for rock foundation for irrigation pump site. Examined two tracts of land in Cascade County for purposes of mineral classification. In cooperation with the Geologic Branch continued structural and stratigraphic investigations in the Little Rocky Mountains area, Phillips and Fergus Counties. Initiated an investigation of the coal resources of the Otter Creek district and Big Horn, Powder River, and Rosebud Counties. Made field investigation and prepared report on foundation for a pipe line. Supervised 39 power projects; 91 leases, 21 prospecting permits, and 42 licenses for coal; 7 phosphate leases; 127 leases and 827 prospecting permits for oil and gas on public land; and 2 Indian agency coal mines, 7 coal and 3 silver-lead-gold leases, 1 bentonite lease, and 50 oil and gas leases on Indian land.

Nevada.—Supervised 26 power projects, 5 coal prospecting permits, 1 phosphate lease, 6 sodium permits, 1 potash permit, and 68 prospecting permits for oil and gas on public land, and 11 marl leases on Indian land.

New Mexico.—Continued an areal, stratigraphic, and subsurface structural investigation in Lea and Eddy Counties for purposes of mineral classification. In cooperation with the Geologic Branch continued investigations of the coal resources and oil possibilities of the east side of the San Juan Basin, including the Lumbarton and Monero districts, Rio Arriba County. Made additional studies of Dead Man's Wash erosion area. Supervised 3 power projects, 24 leases, and 20 prospecting permits for coal, 10 permits for sodium, 9 leases and 27 permits for potash, 27 sulphur permits, and 286 leases and 1,689 prospecting permits for oil and gas on public land, and 6 agency coal mines, 2 coal leases, 63 individual Indian coal mines, and 5 oil and gas leases on Indian land.

North Dakota.—Supervised 66 leases, 1 prospecting permit, and 21 licenses for coal, 4 permits for sodium, and 4 leases and 23 prospecting permits for oil and gas on public land.

Oklahoma.—Investigated oil and gas prospecting operations in western Oklahoma in aid of mineral classification. Supervised 3 power projects, 15 leases, and 87 prospecting permits for oil and gas on public land, and 30 leases, 23 mining permit leases, 1 leased purchased tract, 7 unleased purchased tracts, and 1 temporary mining permit for coal, 1 asphalt lease, and 1 right-of-way lease on segregated tribal and restricted allotted Indian lands, 44 zinc-lead leases on Quapaw Indian land, and 5,265 oil and gas leases on Indian land.

Oregon.—Examined 1 tract of land in Clatsop County for purposes of coal classification. Supervised 37 power projects, 1 lease and 2 prospecting permits for coal, 1 oil-shale lease, and 1 lease and 69 prospecting permits for oil and gas on public land.

South Dakota.—Completed a structural and stratigraphic investigation of the Gustave district in Butte and Harding Counties. Supervised 5 leases and 3 prospecting permits for coal and 46 prospecting permits for oil and gas on public land, and 6 oil and gas leases on Indian land.

Utah.—In cooperation with the Geologic Branch continued structural and stratigraphic investigations of the Henry Mountains area, in Wayne and Garfield Counties, and the Strawberry Valley quadrangle, in Utah and Wasatch Counties. Surveyed 6 square miles of mineral leaseholds. Supervised 16 power projects, 52 leases, 43 prospecting permits, and 3 licenses for coal, 4 sodium permits, 1 phosphate lease, and 39 leases and 887 prospecting permits for oil and gas on public land.

Washington.—Completed 32 miles of river-utilization surveys and surveyed in detail 4 dam sites on Tolt River. Supervised 21 power projects, 1 lease and 12 prospecting permits for coal, 1 sodium permit, and 8 prospecting permits for oil and gas on public land, and 5 silver-gold leases, 6 tungsten leases, and 1 oil and gas lease on Indian land.

Wisconsin.—Supervised 1 power project.

Wyoming.—Initiated topographic, structural, and stratigraphic investigations of the Lance Creek oil and gas field, in Niobrara County. Completed a structural and stratigraphic investigation of the Muskrat gas field, in Fremont County, and continued structural investigations of the Dewey and Mule Creek areas, in Weston County, for purposes of mineral classification. Examined two tracts of land in Lincoln County for purposes of coal classification. In cooperation with the Geologic Branch, continued investigations of phosphate deposits in northern Lincoln County. Completed structural and stratigraphic investigations of the Cody-Pitchfork district, in Park County, continued similar investigations of the east side of the Big Horn Basin, in Big Horn County, and initiated similar investigations of the Shoshone district, in Park County. Surveyed 6.5 square miles of mineral leaseholds. Supervised 6 power projects, 61 leases, 53 prospecting permits, and 22 licenses for coal, 2 permits for sodium, and 520 leases and 1,626 prospecting permits for oil and gas on public land, and 41 oil and gas leases on Indian land. Performed technical supervision at Emergency Conservation Camp 858, established for conserving coal deposits.

WORK ON PUBLICATIONS

Texts.—The book publications of the year numbered 56 in the regular series and 23 pamphlets and circulars for administrative use. The total number of pages was 8,910. Besides these printed publications 24 brief papers were issued in mimeographed form as memoranda

for the press or as informative circulars. During the year, 19,857 pages of manuscript were edited and prepared for printing, 2,537 galley proofs were read, and 9,714 page proofs were revised. Indexes were prepared for 47 publications, covering 7,386 pages. Copy and proof or stencils for 252 pages of multigraph or mimeograph matter were read. During the year, 75 foreign letters, in German, French, Spanish, Italian, and Portuguese, were translated.

Illustrations.—The section of illustrations prepared 1,657 drawings and photographs, transmitted 722 illustrations to accompany 32 reports, received and examined 1,009 proofs, and examined 60 edition prints.

Geologic map editing and drafting.—The geologic map of the Front Range, Colo., accompanied by a geologic legend, was prepared for engraving, and proof of the map and legend were read. The map is ready for transfer to printing plates. Color scheme for the map was prepared. A total of 182 illustrations, comprising geologic maps, sections, and diagrams, were drawn in the section to illustrate scientific papers of geologists. The drawings for 22 papers were edited, and proofs of 24 geologic maps and sections were read and corrected.

Distribution.—A total of 559 publications, comprising 56 new books and pamphlets, 106 new or revised topographic and other maps, 205 reprinted topographic and other maps, and 192 advance sheets were received during the year. A number of special pamphlets and forms for administrative use were also delivered and distributed. The total units of all publications received numbered 126,832 books and pamphlets and 943,340 topographic and other maps, a grand total of 1,070,172. The division distributed 112,010 books and pamphlets, 2,943 geologic folios, and 770,234 maps, a grand total of 885,187, of which 2,871 folios and 617,803 maps were sold. The net proceeds (gross collections less copying fees and amounts refunded) from the sales of publications were \$38,832.79, including \$38,307 for topographic and geologic maps, and \$525.79 for geologic folios. In addition to this \$9,877.92 was repaid by other establishments of the Federal Government at whose request maps or folios were furnished. The total receipts, therefore, were \$48,710.71.

Engraving and printing.—During the year 86 newly engraved topographic maps, including 3 revised maps, were printed, and also 24 special maps, making a total of 110 new maps printed and delivered. Of the newly engraved maps 59 were completed under the Public Works allotment. Corrections were engraved on the plates of 256 maps. Reprint editions of 190 engraved topographic maps and 12 photolithographed State and other maps were printed and delivered. In addition, 73 new topographic maps had been engraved and were in press June 30, including 53 under Public Works allotment, and the engraving of 111 other new topographic maps was in hand, including

54 under Public Works allotment. Of new and reprinted maps, 312 different editions, amounting to 822,475 copies, were delivered.

A large amount of work was done for 72 other units of the Government and State governments, and the charges for it amounted to about \$195,000, for which the appropriation for engraving and printing geologic and topographic maps was reimbursed.

Transfer impressions numbering 445 were made during the year, and the amount turned over to miscellaneous receipts was \$548.20.

Of topographic maps and contract and miscellaneous work of all kinds, a grand total of 4,331,170 copies were printed and delivered.

The photographic laboratory made 8,772 negatives (including 3,901 wet plates for photolithographs, 653 wet plates for photographic prints, 54 paper negatives, 1,426 dry plates, 521 lantern slides, 230 half-tone negatives, and 1,987 field negatives), 14,848 prints (including 1,302 maps and diagrams, 148 celluloid positives, 12,949 photographs for illustrations and records, and 449 bromide enlargements), 3,500 zinc plates, 309 intaglio etchings, and 10 celluloid prints, and mounted 2,052 prints.

LIBRARY

The total number of books and separate items circulated by the library amounted to 46,000. Books borrowed from other libraries for the use of the Geological Survey numbered 827, and books loaned to other libraries numbered 1,469. More than 21,000 new books, periodicals, maps, and other items were received, and more than 8,000 new cards were filed in the catalog.

About 1,400 books were bound at the Government Printing Office at a cost of more than \$7,000, which just about covered the binding of the new acquisitions of the year.

The bibliography of North American geology for 1935-36 was published as Bulletin 892.

APPROPRIATIONS AND EXPENDITURES

The appropriation made directly for the work of the Geological Survey for the fiscal year 1938 included 10 items, amounting to \$2,927,000, of which \$67,822.69 remained unobligated on June 30, 1938. In addition, \$6,500 was allotted from the appropriation for contingent expenses of the Department of the Interior for miscellaneous supplies.

Financial Statement of the Geological Survey for the Fiscal Year 1938

	Funds available			Obligations			Balance	
	Amounts appropriated or transferred	Repayments and adjustments		Total	Disbursements	Outstanding liabilities		Total
		Made	To be made					
Salaries.....	\$140,000.00	\$227.67	-----	\$140,227.67	\$140,224.69	-----	\$2.98	
Topographic surveys.....	650,000.00	325,730.16	\$51,603.71	1,027,333.87	973,636.03	\$41,693.88	12,003.96	
Geologic surveys.....	500,000.00	19,814.95	8,517.74	528,332.69	511,684.36	7,723.36	8,924.97	
Alaskan mineral resources.....	60,000.00	159.44	-----	60,159.44	47,748.21	58,166.16	1,903.28	
Gaging streams.....	900,000.00	387,501.82	150,783.91	1,438,235.73	1,382,412.31	10,417.95	27,683.08	
Classification of lands.....	100,000.00	1,348.36	534.34	101,882.70	98,237.79	28,190.34	2,688.07	
Printing and binding.....	120,000.00	-----	-----	120,000.00	18,335.64	95,664.36	6,000.00	
Preparation of illustrations.....	22,000.00	-----	-----	22,000.00	21,979.42	1.50	19.08	
Geologic and topographic maps.....	120,000.00	160,349.20	41,170.71	321,519.91	287,092.05	313,401.70	8,118.21	
Mineral leasing.....	315,000.00	20,242.77	1,698.24	336,941.01	330,949.80	5,602.15	389.06	
Total.....	\$2,927,000.00	915,374.37	254,308.65	4,095,683.02	3,812,300.30	216,560.03	67,822.69	
Central Valley reclamation project, California (reimbursable) (transfer to Geological Survey), 1938.....	20,000.00	-----	-----	20,000.00	-----	754.99	19,245.01	
Flood control, general (transfer to Interior, Geological Survey, Act Aug. 9, 1937).....	4,000.00	-----	-----	4,000.00	1,707.05	25.00	2,297.95	
Flood control, Mississippi River and tributaries (transfer to Interior, Geological Survey, Act Aug. 9, 1937).....	4,000.00	-----	-----	4,000.00	2,847.13	1,046.38	106.49	
Irrigation, Indian reservations (reimbursable), (transfer to Geological Survey, Act Aug. 9, 1937), 1938.....	15,750.00	-----	-----	15,750.00	9,447.19	5,948.42	354.39	
Maintenance and improvement of existing river and harbor works (transfer to Interior, Geological Survey, Act June 22, 1936).....	8,106.98	3.73	-----	8,110.71	7,414.39	602.48	93.84	
Maintenance and improvement of existing river and harbor works (transfer to Interior, Geological Survey, Act Aug. 9, 1937).....	62,670.00	36.23	-----	62,706.23	38,357.50	14,521.99	9,826.74	
Maintenance, Wapato irrigation and drainage system, etc., Yakima Reservation, Wash. (receipt limitation) (transfer to Geological Survey, Act Aug. 9, 1937), 1938.....	500.00	-----	-----	500.00	147.36	352.64	-----	
National Industrial Recovery, Interior, Indians (transfer to Geological Survey, Act June 22, 1936), 1933-39.....	357.82	-----	20.88	387.70	275.41	305.41	82.29	
National Industrial Recovery, Interior, Geological Survey, 1933-39.....	93,524.89	1,504.90	18.58	95,048.37	79,442.05	4,494.72	11,111.60	
National Industrial Recovery, Interior, National Resources Committee, Interior, Geological Survey, 1933-39.....	1,393.22	-----	-----	1,393.22	1,146.91	.91	245.40	
Operation and conservation of naval petroleum reserves (Navy transfer to Interior, Geological Survey, Act Aug. 9, 1937), 1938.....	40,000.00	3.91	-----	40,003.91	39,934.53	3.40	65.98	
Public Works Administration, allotment to Interior, Geological Survey, 1935-39.....	300,892.72	5,212.92	1,410.12	307,515.76	195,480.91	6,555.76	105,479.09	

Supervising mining operations on leased Indian lands (transfer to Geological Survey, Act Aug. 9, 1937), 1938.	80,000.00	230.68	176.34	80,407.02	80,219.81	179.80	80,399.61	7.41
Tennessee Valley Authority fund (transfer to Interior, Geological Survey, Act Aug. 9, 1937), 1938.	119,889.40	913.08	31.66	120,834.83	101,647.12	12,483.66	114,130.78	6,704.05
Tennessee Valley Authority fund (transfer to Interior, Geological Survey, Act June 22, 1935).	b 3,155.39	2,082.60		5,237.99	5,233.24		5,233.24	4.75
Waterways Treaty, United States and Great Britain (transfer to Interior, Geological Survey, Act June 16, 1937), 1938.	48,500.00			48,500.00	33,529.83	13,170.08	46,699.91	1,800.09
Working fund, Department of the Interior (transfer from Army Engineers to Geological Survey, for topographic mapping, fiscal year 1935).	b 10,702.40		24.16	10,726.56	4,571.71	219.16	4,790.87	5,935.69
Working fund, Interior, Geological Survey (Agriculture, cooperative construction of rural post roads).	c 38,456.72	778.58	1,066.63	40,301.93	21,168.04		21,168.04	19,133.89
Working fund, Interior, Geological Survey (Agriculture, highway funds, Act of June 16, 1933, National Industrial Recovery).	f 34,402.91	2,683.32		37,086.23	13,692.13		13,692.13	23,394.10
Working fund, Interior, Geological Survey (War, rivers and harbors).	b 168.15	9.45		177.60	177.60		177.60	
Transfer total.	886,470.69	13,460.00	2,757.37	902,688.06	636,439.91	60,389.39	696,829.30	205,858.76
Grand total.	3,813,470.69	928,834.37	257,066.02	4,999,371.08	4,448,740.21	276,949.42	4,725,689.63	273,681.45

^a In addition to these appropriations there was an allotment of \$6,500 for miscellaneous supplies from the appropriation for contingent expenses of the Department of the Interior.

^b Balance unobligated on June 30, 1937, and continued available for expenditure during the fiscal year 1938.

^c Of the balance of \$161,524.89 remaining on June 30, 1937, \$98,000 has been rescinded.

^d Includes \$892.72 unobligated on June 30, 1937, and continued available for expenditure during the fiscal year 1938.

^e Includes \$18,456.72 unobligated on June 30, 1937, and continued available for expenditure during the fiscal year 1938.

^f Includes \$14,402.91 unobligated on June 30, 1937, and continued available for expenditure during the fiscal year 1938.

Classification of Obligations Incurred by the Geological Survey During the Fiscal Year Ended June 30, 1938

	Salaries	Topographic surveys	Geologic surveys	Alaskan mineral resources	Gaging streams
Salaries of permanent employees.....	\$140, 224. 69	\$681, 451. 21	\$432, 904. 03	\$33, 928. 76	\$927, 348. 88
Wages of temporary employees.....		282, 414. 73	17, 071. 84	3, 133. 32	163, 524. 40
Supplies and materials.....		10, 296. 23	6, 688. 72	2, 495. 23	24, 790. 27
Dead storage of passenger-carrying vehicles.....		3. 10	5. 00		12. 00
Other storage and pasturage of animals.....		708. 23	173. 69		318. 52
Communication services.....		781. 11	401. 06	34. 45	5, 445. 72
Travel expenses.....		95, 812. 20	25, 350. 63	11, 652. 12	96, 912. 32
Hire, maintenance, repair, and operation of passenger-carrying vehicles.....		1, 375. 05	3, 534. 81	19. 87	37, 561. 14
Transportation of things.....		2, 737. 52	1, 575. 44	1, 439. 91	10, 631. 31
Hire, maintenance, repair, and operation of freight-carrying vehicles.....		38, 428. 98	5, 685. 12	74. 44	34, 216. 34
Printing and binding.....		89, 700. 35	7, 190. 52	2, 318. 72	5, 277. 96
Furnishing of heat, light, power, water, and electricity.....					183. 50
Rents.....		15. 00	202. 50	150. 00	2, 597. 99
Repairs and alterations.....		5, 868. 48	3, 559. 87	545. 26	38, 908. 30
Special and miscellaneous current expenses.....		7. 20	8. 84	29. 67	42. 08
Purchase of passenger-carrying vehicles.....		1, 303. 21	1, 677. 28		18, 066. 18
Purchase of freight-carrying vehicles.....		4, 979. 57	2, 841. 18		23, 111. 03
Purchase of scientific instruments and parts.....		3, 590. 88	2, 690. 18	55. 11	59, 005. 91
Other equipment.....		8, 667. 70	7, 850. 41	2, 289. 30	25, 190. 52
Structures and parts.....					24, 912. 93
Miscellaneous refunds, adjustments, and transfers.....		100, 006. 90			176, 215. 97
Total.....	140, 224. 69	1, 328, 147. 65	519, 411. 12	58, 166. 16	1, 674, 273. 27

	Classification of lands	Printing and binding	Preparation of illustrations	Geologic and topographic maps	Mineral leasing	Total
Salaries of permanent employees.....	\$82, 219. 58		\$21, 558. 16	\$235, 975. 11	\$375, 733. 99	\$2, 931, 344. 41
Wages of temporary employees.....	4, 170. 82			233. 32	1, 681. 89	472, 230. 32
Supplies and materials.....	522. 47		56. 01	41, 060. 28	1, 140. 44	87, 049. 65
Dead storage of passenger-carrying vehicles.....					22. 02	42. 12
Other storage and pasturage of animals.....	57. 89				41. 61	1, 299. 94
Communication services.....	227. 20			2. 69	2, 382. 66	9, 274. 89
Travel expenses.....	6, 940. 57		3. 90	506. 70	17, 533. 03	254, 711. 47
Hire, maintenance, repair, and operation of passenger-carrying vehicles.....	1, 494. 69			39. 64	13, 729. 31	57, 754. 51
Transportation of things.....	217. 45			161. 89	2, 638. 78	19, 402. 30
Hire, maintenance, repair, and operation of freight-carrying vehicles.....	1, 398. 77				154. 18	79, 957. 83
Printing and binding.....	285. 60	\$114, 000. 00	331. 49		409. 53	219, 514. 17
Furnishing of heat, light, power, water, and electricity.....					4, 471. 11	4, 654. 61
Rents.....					507. 10	3, 472. 59
Repairs and alterations.....	143. 45		4. 19	10, 227. 84	3, 304. 15	62, 561. 54
Special and miscellaneous current expenses.....					68. 83	156. 62
Purchase of passenger-carrying vehicles.....	853. 00				4, 192. 50	26, 092. 17
Purchase of freight-carrying vehicles.....						30, 931. 78
Purchase of scientific instruments and parts.....	112. 22		22. 72	19. 50	25. 38	65, 521. 90
Other equipment.....	550. 92		4. 45	19, 310. 84	9, 321. 81	73, 185. 95
Structures and parts.....						24, 912. 93
Miscellaneous refunds, adjustments, and transfers.....				5, 863. 89	19, 531. 17	301, 617. 93
Total.....	99, 194. 63	114, 000. 00	21, 980. 92	313, 401. 70	456, 889. 49	4, 725, 689. 63

In addition to the above amounts, there was expended directly by cooperating agencies \$41,243.55 for topographic surveys, \$966.92 for geologic surveys, and \$480,481.61 for stream gaging.

APPENDIX

Summary of Outstanding Mineral Withdrawals and Classifications

[June 30, 1938, in acres]

State	Coal		Oil		Oil shale		Phosphate		Potash
	With- drawn	Classified as coal land	With- drawn	Classi- fied as oil land	With- drawn	Classi- fied as oil-shale land	With- drawn	Classi- fied as phos- phate land	With- drawn
Alaska.....		56,993							
Arizona.....	139,415								
Arkansas.....		61,160							
California.....	17,603	8,720	1,178,392						90,324
Colorado.....	4,142,233	3,082,272	215,370		1,172,778	952,239			
Florida.....							66,796	120	
Idaho.....	11,520	4,603					276,239	270,036	
Louisiana.....			466,990	4,233					
Montana.....	6,259,193	9,373,884	1,336,697	67,651			280,089	3,833	
Nevada.....	83,673								39,422
New Mexico.....	4,119,616	984,829							9,282,160
North Dakota.....	5,954,364	11,178,286	84,894						
Oregon.....	4,361	18,887							
South Dakota.....		250,093							
Utah.....	3,404,043	1,267,697	1,344,473		2,737,274	2,703,755	277,344	2,937	
Washington.....	691,801	141,444							
Wyoming.....	2,143,991	36,847,235	541,777		2,079,897	425,214	989,133	25,293	
Total.....	26,971,813	33,276,103	5,168,593	71,884	5,989,949	4,081,208	1,889,601	302,219	9,411,906

¹ Includes 3,151 acres of coal land reserved for use of the United States (coal reserve No. 1.)

² Includes 13,578 acres withdrawn as helium reserve.

³ Includes 2,078 acres of coal land reserved for use of the United States (coal reserve No. 2.)

General Summary of Cases Involving Land Classification

Class of cases	Record for fiscal year 1937-38						Record since receipt of first case	
	Pending prior to July 1, 1937	Re- ceived during fiscal year	Total	Acted on during fiscal year	Pending June 30, 1938	Gain or loss during fiscal year	Re- ceived	Acted on
Mineral leasing laws:								
Permit applications.....	17	162	179	169	10	+7	62,515	62,505
Lease applications.....	411	2,773	3,184	2,351	833	-422	7,091	6,258
Committee cases.....	12	64	76	76		+12	13,221	13,221
Concurrence.....	64	979	1,043	1,011	32	+32		
Interference (surface rights).....	10	210	220	217	3	+7		
Unit operation plans.....	161	284	445	391	54	+107	1,637	1,583
Cases involved in unit plans.....	966	1,350	2,316	1,907	409	+557	5,392	4,983
Development (drilling opera- tions, etc.).....	2	53	55	51	4	-2	17,632	17,628
Miscellaneous.....		7,919	7,919	7,697	222	-222	7,919	7,697
Mineral classification:								
Oil and gas (including "349").....	264	1,014	1,278	1,218	60	+204	30,957	30,897
Water and power:								
Federal Power Commission:								
Preliminary permits.....	12	69	81	75	6	+6	515	509
Licenses.....							28	28
Determinations under Sec. 24.....	3	63	66	58	8	-5	691	683
Classification.....	3	5	8	7	1	+2	562	561
Rights-of-way.....	30	128	158	143	15	+15	7,454	7,439
Irrigation project reports.....		1	1		1	-1	945	944
General information:								
General Land Office (coopera- tives, etc.).....	27	124	151	138	13	+14		
Indian Office.....							9,549	9,549
Total.....	1,982	15,198	17,180	15,509	1,671	+311		

¹ Classification of the status of oil and gas prospecting permits under the act of August 26, 1937 (50 Stat. 842), as required by Departmental Order No. 1240 of December 23, 1937.

Mineral Production From Public Land and Revenues Accrued Therefrom, Fiscal Year 1938

State	Petroleum (barrels)	Natural gas (M cubic feet)	Gasoline (gallons)	Coal (short tons)	Potas- sium (short tons)	Sodium (short tons)	Phos- phate (short tons)	Accrued revenues
Alaska.....	-----	-----	-----	124, 272	-----	-----	-----	\$7, 233. 73
Alabama.....	-----	-----	-----	57, 290	-----	-----	-----	5, 729. 00
California.....	19, 892, 830	39, 527, 576	4, 426, 154	59	-----	61, 787	-----	3, 919, 171. 96
Colorado.....	1, 006, 257	1, 413, 857	49, 427	491, 228	-----	1, 325	-----	132, 542. 42
Idaho.....	-----	-----	-----	1, 474	-----	-----	-----	438. 38
Louisiana.....	249, 081	1, 515, 747	11, 639	-----	-----	-----	-----	240, 837. 14
Montana.....	474, 054	2, 707, 391	-----	274, 451	-----	-----	20, 291	87, 993. 06
New Mexico.....	8, 195, 801	20, 394, 774	8, 617, 429	42, 509	572, 307	6, 193	-----	941, 851. 42
North Dakota.....	-----	25, 745	-----	432, 115	-----	-----	-----	28, 596. 58
Oklahoma.....	146, 095	-----	197, 699	-----	-----	-----	-----	21, 110. 01
South Dakota.....	-----	-----	-----	3, 178	-----	-----	-----	530. 29
Utah.....	180	2, 266, 048	453, 431	1, 080, 352	-----	-----	-----	134, 226. 62
Washington.....	-----	-----	-----	20, 690	-----	-----	-----	2, 069. 53
Wyoming.....	11, 666, 070	12, 081, 292	25, 754, 114	1, 267, 023	-----	-----	-----	1, 706, 161. 98
Total.....	41, 630, 368	79, 932, 430	39, 509, 893	3, 794, 641	572, 307	69, 305	20, 291	7, 228, 492. 12
Total, 1937.....	37, 556, 776	80, 186, 340	97, 838, 813	4, 221, 203	449, 584	75, 870	26, 104	6, 338, 007. 08

State	Total area mapped during fiscal year 1938 (square miles)										Types of standard surveys, with contour intervals from 5 to 100 feet on scale of 1 to—	Total area mapped to June 30, 1938 (square miles)	Percentage of State mapped to June 30, 1938	Control, fiscal year 1938		
	For publication with contour intervals from 5 to 100 feet on scale of 1 to—													Spirit levels (miles)	Transit traverse (miles)	Triangulation stations occupied
	Planimetric on scale of 1 to—	48,000	31,680	12,000	15,840	24,000	30,000	31,680	48,000	62,500						
Alabama.....												21,983	42.3			
Arizona.....									761			23,000	23.4			1
Arkansas.....									415			24,046	43.1		76	21
California.....									120	305		129,143	81.6	155		
Colorado.....				6		21			239			57,282	55.1	632	628	18
Connecticut.....												4,965	100.0	18		
Delaware.....									56			2,370	100.0			
District of Columbia.....												70	100.0			
Florida.....												6,373	10.9			
Georgia.....									13			25,202	42.5			
Idaho.....									329			35,993	42.9	34		8
Illinois.....									532			40,889	72.2	199		
Indiana.....												4,640	12.8	829	633	
Iowa.....									353			13,710	24.4			
Kansas.....												64,446	78.4	272	231	
Kentucky.....									383			27,358	67.4			
Louisiana.....			1,014									11,330	23.4	95	434	
Maine.....									582			12,876	66.2			
Maryland.....												12,327	100.0			
Massachusetts.....												8,266	100.0			
Michigan.....									513			15,181	26.2	23	596	1
Minnesota.....			131									8,890	10.5			
Mississippi.....												7,511	16.9			
Missouri.....												53,304	76.8	796	417	36
Montana.....			932	11		664						37,078	23.2	413		
Nebraska.....						198				137		27,931	36.0			
Nevada.....									247			43,180	39.0	6		21
New Hampshire.....												9,302	100.0	40		
New Jersey.....												8,224	100.0	22		
New Mexico.....								56				32,778	26.7	160		16
New York.....									695			49,204	100.0	180		
North Carolina.....								90				19,040	36.3			
North Dakota.....												14,757	20.8	151	132	
									223							

See footnotes at end of table.

Topographic Mapping by the Geological Survey in the United States, Puerto Rico, and Hawaii, to June 30, 1938—Continued

State	Total area mapped during fiscal year 1938 (square miles)										Types of standard surveys, with contours, fiscal year 1938 (square miles)			Total area mapped to June 30, 1938 (square miles)	Percent- age of total area mapped to June 30, 1938	Control, fiscal year 1938		
	For publication with contour intervals from 5 to 100 feet on scale of 1 to—										Revi- sion					Spirit levels traverse (miles)	Transit traverse (miles)	Triangu- lation stations occupied
	a Planimetric on scale of 1 to—	48,000	31,680	12,000	15,840	24,000	30,000	31,680	48,000	62,500	125,000	New sur- vey	Revi- sion					
Ohio.....														41,040	100.0			
Oklahoma.....														42,172	60.2			
Oregon.....										270		171		33,560	34.7	303		
Pennsylvania.....										504		423	81	40,585	89.9			
Rhode Island.....								46				46		1,248	100.0	35		
South Carolina.....										38		38		15,278	49.3	42		
South Dakota.....														19,887	25.6	10		
Tennessee.....														23,633	56.2			
Texas.....										6		553		90,428	34.0	207	290	26
Utah.....										233		133	225	19,322	22.7	335		
Vermont.....										56		112		8,864	92.7			
Virginia.....														37,897	88.9	98	150	29
Washington.....														42,192	61.0	132	32	2
West Virginia.....														24,170	100.0			
Wisconsin.....										9		9		19,817	35.3		754	7
Wyoming.....												163		34,244	35.0	13		
Total.....	332	1,145	20	49	2,842			2,095	1,401	5,804	1,102	6,631	6,038	624	45.0	5,150	4,373	186
Hawaii.....																		
Puerto Rico.....																		
												244		26		260		28

^a Compiled from aerial photographs with field examination. Show culture, drainage, and woodland, but no contours.

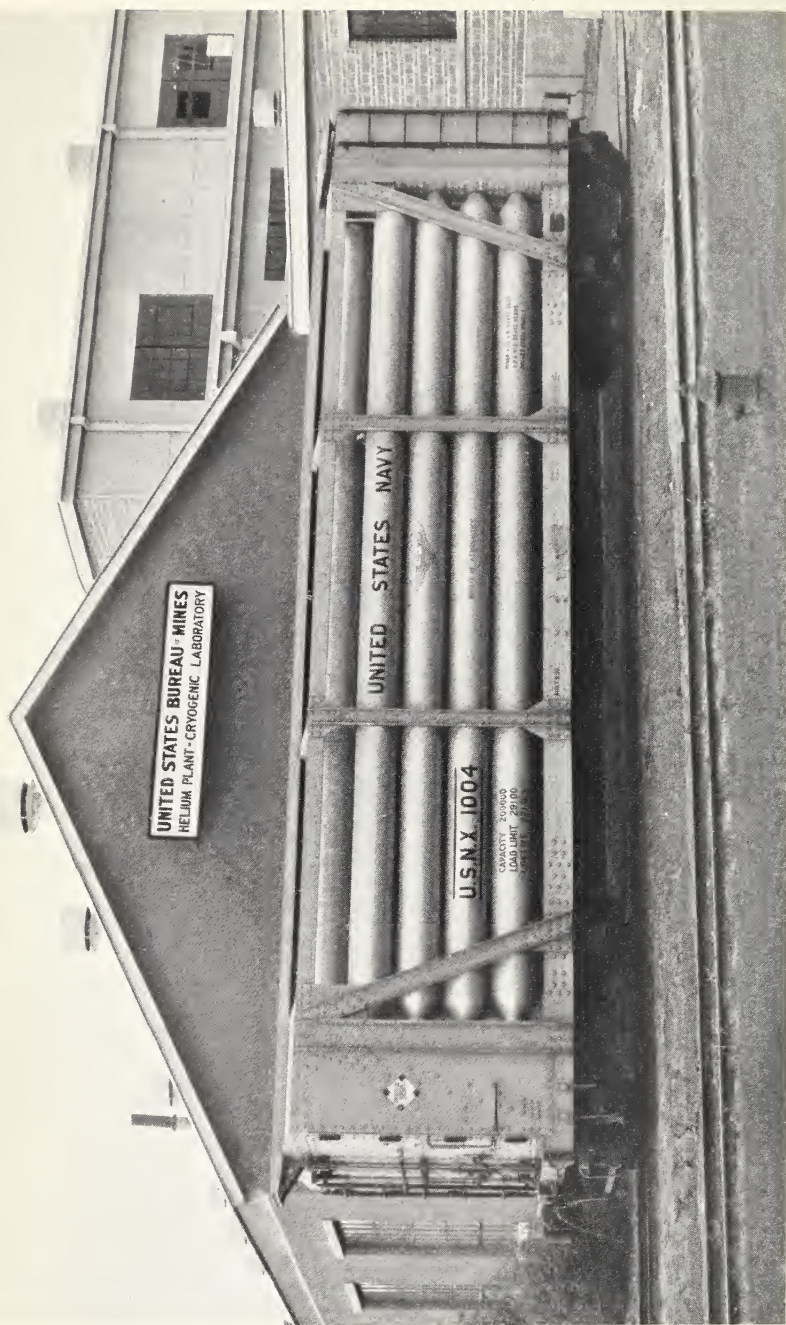
^b Mapped on aerial photographs by stereophotogrammetric methods.

^c Mapped on a scale of 1:4,800.

^d Includes 36 square miles mapped from aerial photographs by stereophotogrammetric methods.

^e Areas in Arizona, California, Montana, Nevada, New Mexico, Oregon, and Utah, which were surveyed by the Geological Survey prior to 1896 by reconnaissance methods and included in previous reports, have been eliminated from this table as areas unmapped and the maps withdrawn from distribution.

^f Contour interval 5 meters.



A SPECIALLY DESIGNED TANK CAR FOR THE TRANSPORTATION OF HELIUM FROM THE BUREAU OF MINES PLANT AT AMARILLO, TEX.

BUREAU OF MINES

John W. Finch, *Director*

DURING the fiscal year 1938 the Bureau of Mines has made definite progress in its dual program of safety in the mining industry and conservation of mineral resources.

The Bureau was founded in response to the popular demand that the Government do something to halt the appalling mine disasters that blackened the first decade of the twentieth century. One of the first jobs undertaken, therefore, was to win operators and miners alike over to a regime of safe mine operation. Improvement was painfully slow at first. Gradually it became evident that a man who was trained to render first aid to others usually took good care that others would not have to render first aid to him. In other words, graduates of the Bureau's courses in first aid and mine rescue were less likely than untrained men to take risks with themselves, with others, and with company property.

The number so trained since the Bureau's inception passed the million mark some time ago. On July 1 of this year it had reached the encouraging total of 1,146,854 persons; 1938 gave the records a substantial boost because, for the first time since 1931, over 100,000 persons were trained—105,093, to be exact. Now the coal industry is rapidly approaching the million mark on its own account; 835,581 members of that group have received their certificates.

The demand for Bureau safety instruction has spread rapidly in recent years. The men have found that a Bureau first-aid training certificate is regarded by employers as a virtual letter of recommendation, and accordingly workers in numerous occupations not strictly within the mining industry have made urgent requests for training.

Complementary to the Bureau's work of this kind has been the continuing investigation of safe working conditions, including not only safe equipment but pure, breathable air, uncontaminated by carbon monoxide and other noxious gases or by the equally insidious silica dust.

The Bureau of Mines believes, with its first Director, Joseph A. Holmes, that "True conservation is a wiser and more efficient utilization of our national resources." Accordingly, in the varied services it renders the mining industry in a variety of fields, the Bureau empha-

sizes the idea of use without unnecessary waste. Coupled with this is a correlative program of pointing out new uses for little-known materials and of helping our mining men and metallurgists to devise processes of treating American minerals so that they can be substituted gradually for uncertain supplies from abroad.

The strategic minerals—those vital to industry in peace and indispensable in war—have received special attention. The Bureau has devised and patented a process for producing 99.7-percent-pure manganese metal from low-grade domestic ores. It has conducted tests with a variety of American clays to prove that they can be used for wares as attractive and sturdy as expensive imported ceramics. And it has pointed the way to exploitation of the potash deposits of the Southwest that now furnish fertilizer salts equal to those of Germany and France.

The utilization of solid, liquid, and gaseous fuels has been of continuing interest to the Bureau for nearly three decades. Current standards for fuel are very exacting. Consumers demand a commodity that is clean and easy to use. Pictures of entrancing basement recreation rooms have banished many a coal bin. Nevertheless, the Nation's coal resources are much larger than the known resources of petroleum and natural gas, and since coal will doubtless be a standard fuel indefinitely the object now is to supply coal to householders in as clean and efficient a form as possible. The Bureau, especially at its stations in the Northwest and South, has tested the effectiveness of pretreatment on hundreds of samples of coal; it is now possible to obtain washed and dedusted bituminous coals that represent a decided advance in cleanness and efficiency over the dirty, crumbling fuel supplied a few years ago.

Knowing that the present-day economic structure depends upon petroleum and that the Nation's reserves of crude oil are not inexhaustible, the Bureau has pioneered in conducting tests on coal hydrogenation—a process already successfully applied in England, Germany, and Japan for obtaining oil from coal. By the time our oil fuels approach depletion, it is hoped that motor fuel can be supplied from coal so efficiently and cheaply that the transfer can be made from the old fuel to the new without drastic adjustments.

The cordiality of the relations between the petroleum industry and the Bureau's petroleum engineers is an outstanding example of friendly cooperation. The Bureau's exhaustive field studies—which unfortunately have been able to cover but a small part of the country's petroleum fields—frequently have been considered so valuable that the expense of publishing results has been defrayed by a State or trade organization.

Various State boards have asked the Bureau's petroleum engineers to assist them in cooperative studies of special problems. In Kansas,

for example, the Bureau has developed methods for disposing of oil-field brines, which were affecting livestock and crops and contaminating supplies of drinking water.

Natural-gas operators experience much trouble from freezing of pipe lines. Bureau engineers have invented an apparatus for determining the dew point of natural gas under pressure—that is, the temperature at which water will condense from the gas. Use of the device is helping to avoid interruption of service that may result from plugging of transmission lines with ice or compounds of water and hydrocarbons that solidify at temperatures above the freezing point of water.

For years the Bureau has been the Government's consultant on fuels. In addition to the samples of coal analyzed in connection with carbonization and classification studies, thousands of others from lots destined for Government office buildings, schools, and hospitals are examined at the tipple and at the point of delivery. Moreover, the Bureau gives advice to the Bureau of the Budget on the burning of fuels and the purchase and operation of equipment. This service saves the Government a considerable sum each year. In 1938 alone adoption of the Bureau's suggestions resulted in economies totaling about \$600,000, nearly 25 percent of the total funds allotted to the Bureau; thus it made a substantial contribution to its own support.

After issuing several hundred reports on individual mining and milling operations, the Bureau is assembling data under broad, general subjects, such as copper mining, or upon important mining districts. Bureau engineers are continuing to advise operators of small mines regarding safe and efficient methods.

Any disaster involving an explosion usually means a call upon the Bureau to determine the cause and to make suggestions for avoiding future catastrophes. No small part of the time of engineers in several Bureau divisions is taken by such emergency service.

A new policy was adopted in publishing the annual Minerals Yearbook. It had been noted that, although the copy did not go to press until the end of June, certain chapters, including final data for the preceding year, were completed several months before. By accelerating the publication schedule, it was found possible to pre-print 47 chapters out of the 70 comprising the volume before the complete manuscript went to press. Inasmuch as the Yearbook was not issued until the middle of August, it was possible to give a large sector of the mining industry information on production, foreign trade, and important developments at least 3 months earlier than if release of the complete volume had been awaited.

The scrap-metal demands of countries with extensive armament programs have stimulated the interest of American dealers in any information that affects their industry. In response to their urgent

request for service, the Bureau has augmented its annual scrap-metal survey, which formerly included nonferrous metals only, to include ferrous metals. The creation of a special section to handle data on the production and distribution of scrap metals represents the Bureau's reply to a specific demand by industry.

The Bureau's periodical reports on coal, petroleum, cement, and other commodities and the more general economic publications, such as the Mineral Trade Notes and the Foreign Minerals Quarterly, continue to be in demand.

In 1930, the total attendance at showings of Bureau of Mines films was 1,712,858; in 1933, it had risen to 2,996,000; by 1936, the total was 6,489,000. For the fiscal year 1938 the attendance was 10,351,700. The Bureau's motion-picture library of 4,095 reels and 2,182,530 feet of film is believed to be the largest of its kind in the world. Inasmuch as prominent industrialists have defrayed the cost of production and printing, this public service has been built up at no expense to the Government.

Long before President Roosevelt's inaugural address in 1933 the Bureau of Mines had adopted the policy of the good neighbor. As a direct outgrowth of a trip to this country in 1908 of a distinguished group of foreign government mining specialists an interchange of information on mining practice and equipment was built up. It now finds expression in the biennial mine safety conferences that have been held since 1931. The Fourth International Mine Safety Research Conference was held in Belgium in September 1937, with delegates from the United States, Great Britain, France, Poland, Czechoslovakia and Belgium. The cooperation between the Bureau of Mines and the Safety in Mines Research Board of Great Britain has been exceptionally cordial, and for many years an exchange fellowship was maintained, under the terms of which a member of the Bureau staff was detailed to research work in Great Britain and a member of the Board to research in this country.

The increased facilities made available to the Bureau by completion of the new Southern Experiment Station, Tuscaloosa, Ala. (dedicated in May 1936), the Eastern Experiment Station, College Park, Md. (dedicated in October 1937), and the new laboratory building at the Petroleum Experiment Station, Bartlesville, Okla. (also dedicated in October 1937) will enable it to serve the mining industries more efficiently. All were constructed with funds allotted by the Public Works Administration in response to requests from those who felt that the Bureau was qualified to render a definite service through improved facilities in the localities selected. The Eastern Experiment Station, for example, provides laboratories that are accessible to the entire eastern mineral industry. Additional space to be added at Boulder City, Nev., where the Bureau is conducting important

electrometallurgical experiments on American minerals, especially those obtainable within a reasonable distance from the station, should make possible further contributions to the already long list of achievements in the field the Bureau was created to serve.

FUTURE PROGRAM

The Bureau of Mines agenda for 1939 contemplate continuance of the numerous services rendered to the American mining industry, which have been increasing in number and complexity as the need for them has developed.

In the early days of the Bureau the principal emphasis seems to have been placed on safety instruction and the testing of fuels. Now the Bureau is being asked to show how the electrical energy generated as a byproduct of such huge Government projects as Boulder Dam, Grand Coulee, Bonneville, and the Tennessee Valley, may be converted into a servant of the mining industry, permitting utilization of domestic mineral resources that hitherto have defied man to put them to work. In another field, the Bureau is laying a sound groundwork for the day when depletion of our petroleum resources reaches the point where a motorized nation must begin to look elsewhere for some of its fuel. Moreover, the Bureau, as the Government's representative, is now responsible for the world's production of helium, the versatile gas that is being diverted to a number of uses.

The effect on buildings of blasting in mines and quarries is now being studied by the Bureau with much the same apparatus as is used to investigate earthquakes. Sounds so high that they are virtually beyond the range of the human ear and are therefore termed supersonic have been shown to offer a possible means of precipitating the harmful ingredients from the smoke of chimneys and from obnoxious smelter fumes.

These activities represent application of the sciences in their most modern phases, and are among the most interesting problems on the Bureau's current program. Nevertheless, the fact that they are a far cry from the relative simplicity of its first investigations does not swerve the Bureau from its original ideal of making mining the safest industry in the country and of utilizing America's varied and abundant mineral resources with a minimum of waste.

It is not too visionary to anticipate the day when every mine worker will be trained in first aid. In more than 1,900 mineral establishments 100 percent of the workers have been so trained, and the policy of preparing key men in the various plants to be instructors will relay first-aid knowledge among more men than the Bureau's half hundred safety engineers could possibly reach. If the force of safety men, who not only teach first aid and mine rescue but point out unsafe practices and dangerous machinery in mines, were increased, the cause of mine

safety could be advanced tremendously. Some mines competing in the annual Sentinels of Safety contest have completed a year and more without a single lost-time accident—proof that mining can be conducted without injury to workers.

A factor that contributes to waste of mineral resources is ungoverned production, resulting in accumulation of stock piles that frequently deteriorate before they are used, so that much of the original value is lost. If the Bureau's economists were afforded the opportunity to determine the Nation's requirements of the principal minerals, a way would be open for checking overproduction. At the same time, increments of strategic minerals could be set aside for an emergency without the economic dislocation that accompanied frenzied buying of supplies during the World War.

The Bureau would like to have personnel and facilities to show how many American minerals can be made to serve the Nation and banish the fallacious notion that certain foreign products are best. The next few years should witness substantial progress along these lines in localities where new equipment has been made available for the Bureau's use in demonstrating these facts. Unfortunately, however, in many instances these laboratories cannot give their maximum potential service because the personnel is inadequate.

The Bureau would also like to have at its disposal publications on the mining industry, in simple language, so that those who write for information can be supplied promptly, without the necessity of referring them to technical literature that is far above their needs. Even children in the fourth grade are assigned the study of coal mines as a project, and are encouraged to write to the Government for data. The Bureau is the logical source of such information. Many students learn about the Bureau of Mines through its films and write for publications that usually must be denied them because printing funds are inadequate to permit general distribution.

REVIEW OF THE YEAR'S WORK

During the fiscal year 1938, the work of the Bureau of Mines was administered under the Technologic, Economics and Statistics, Health and Safety, and Administrative Branches from headquarters in Washington, but most of the activities were conducted in mining districts well scattered over the country. Thirteen experiment stations (at Bartlesville, Okla.; Berkeley, Calif.; Boulder City, Nev.; College Park, Md.; Laramie, Wyo.; Minneapolis, Minn.; Pittsburgh, Pa.; Reno, Nev.; Rolla, Mo.; Salt Lake City, Utah; Seattle, Wash.; Tucson, Ariz.; and Tuscaloosa, Ala.) studied problems connected with mining, utilization, and conservation of the Nation's mineral resources, a number of field offices were assigned special duties, and the safety

instructors moved on a flexible schedule, visiting mining establishments on request.

TECHNOLOGIC BRANCH

The function of the Technologic Branch is to conduct engineering and scientific research in the interest of the mineral industries. The branch comprises six divisions—Coal, Mining, Metallurgical, Petroleum and Natural Gas, Nonmetals, and Explosives—and the office of the principal mineralogist. The branch also has charge of the cooperative program between the Bureau and the corresponding Government organizations in several foreign countries.

Coal Division

The Coal Division continued its experimental studies on mining, preparation, and use of coal. The results of an investigation of roof movement in mines afforded a basis for correlation of mining methods and roof behavior and indicated the advantages of removing the coal from a given area rapidly by mechanized mining. Other tests proved that the capacity of coal-cleaning plants was raised by using flocculating agents to remove fine coal and impurities from circulating water. Experiments on burning, carbonizing, and gas making, as well as analyses and measurements of physical properties, gave consumers additional information to guide them in selecting coal suitable for their purposes, thus obtaining greater satisfaction in its use. The experimental hydrogenation plant was developed to the point where assays of the hydrogenating properties of coals can be conducted rapidly.

Carbonization of coal.—Carbonization tests according to the Bureau of Mines-American Gas Association standardized procedure were made on four low-volatile and three high-volatile A-rank coals. The high-volatile coals contracted and the low-volatile coals expanded 16 to 40 percent. It was shown that expansion during coking is a straight-line function of the density of the charge and varies directly with the logarithm of the pressure due to the weight of the charge. The tests indicate that poorly fusing, low-volatile coals expand the most, because in the fused state the mass, being highly viscous, retains the decomposition gases and vapors and is expanded thereby. Washing reduced the ash of the low-volatile coals by only 0.8 percent, but even this reduction improved the coke to a measurable extent.

Analyses of coal for Government.—During the year, 8,681 samples of coal were analyzed in connection with Government purchases that were made on quality specified and verified by analysis, an increase of 11 percent over the past fiscal year.

Constitution and miscellaneous analyses of coal.—The constitution of the coals subjected to carbonizing tests was determined by petro-

graphic analysis. Samples of pure coal constituents—that is, anthraxylon, fusain, splint, spore, cannel, and attrital matter—were separated for hydrogenation studies. High- and low-temperature distillation assays were made on coals from various fields to estimate their coke- and byproduct-making qualities.

Hydrogenation of coal.—During the year quantitative procedures for the hydrogenation assay of American coals were developed, and assay work on one coal was completed. This work involved perfecting mechanical equipment for continuous operation of the plant, training operators for the three shifts necessary to accomplish continuous operation, and developing quantitative tests. The assay determines the optimum conditions in liquid-phase hydrogenation to obtain the maximum yield of a middle oil consistent with complete regeneration of the vehicle used in making a paste with the original coal.

Use of fuels.—An investigation of the effect of adding chemicals on the burning of coal was concluded, and the results were published in Bulletin 404, *Burning of Coal and Coke Treated With Small Quantities of Chemicals*. A small, overfeed stoker tested in combination with a modern hot-water boiler was found to give over-all efficiencies as high as 76 percent with intermittent operation, as in house heating.

Subbituminous coal and lignite.—Research on the utilization of subbituminous coal and lignite, particularly important as fuels in the West and Southwest, was initiated, and one publication on the carbonization of a subbituminous coal from Colorado was prepared.

Fuel-economy service.—To aid Federal agencies to purchase and utilize fuel more efficiently and economically, the fuel-economy service section made numerous power-plant and fuel-efficiency tests, as well as acceptance tests of new equipment; advised on the selection of proper fuel for many specific plants; and acted as consultant to various Government departments on such problems as purchases of fuel and of new equipment and preparation of specifications for various fuels, types of boilers, stokers, and auxiliary equipment. Power-plant expenditures of \$595,450 in this year alone, proposed to the Bureau of the Budget by various agencies, were found unnecessary.

Experimental coal mine.—Tests of a new and simplified design of rock-dust barrier showed that in many respects its behavior was similar to that of other barriers previously tested and recommended by the Bureau. However, simplification has resulted in poorer distribution of rock dust in advance of an explosion, an undesirable feature. Popular interest continues in large-scale demonstrations of coal-dust explosions and means of preventing them. Five such programs were witnessed by 1,500 visitors.

Conclusions and recommendations.—The requests of coal producers and consumers for information and advice based on work of the Coal Division are increasing in number and complexity faster than the facilities of this group have been expanded. Comprehensive surveys of the properties of American coals are urgently needed to enable producers to market their coal and users to obtain suitable coal. Gaseous and liquid fuels (because of their easy application) and lubricants are indispensable to industry; the present outlook is that some of these must eventually be made from coal, and the Coal Division should be prepared to help industry meet such a development. A coal-preparation laboratory to serve the northern Appalachian and eastern interior coal fields is particularly desirable.

Mining Division

The Mining Division continued to study metal-, nonmetal-, and coal-mining methods and costs, extended the mineral-industries survey into a number of areas not previously covered, tested and inspected electrical mining equipment for permissibility in gassy mines, gave technical aid to prospectors and small-scale operators, and conducted basic research on mining problems with regard to economy, safety, and conservation of mineral resources. Forty-six reports describing these investigations were issued during the year by the Bureau, 9 articles were published in the technical press, and 14 completed manuscripts awaited publication at the end of the year.

Metal mining and milling methods and costs.—Twenty-two information circulars in the comprehensive series on mining methods and costs at individual mines and mills were printed during the year. Of these, six described mining methods and costs, two milling methods and costs, and four both mining and milling methods and costs; four others treated general phases of mining, and six were reconnaissance papers on western mining areas or districts in which mining, milling, and general conditions affecting mining were discussed. Bulletin 405, *Copper Mining in North America*, was off press at the end of the fiscal year. Field engineers gave technical advice to prospectors and small operators who obviously could not afford to hire competent consultants.

Metal-mining research.—Original research at the Mount Weather (Va.) testing adit was devoted largely to investigations of (1) alloy-steel rock-drill bits, (2) hard-surface bits, (3) small-diameter full-reaming bits, and (4) dust from mining operations and (5) measurement of vibrations caused by blasting and their effect upon a frame building. The adit is now 540 feet long, and a 100-foot drift has been turned from it. The face is hard, dense basalt, ideal for test work.

Equipment was designed and tests made to measure stresses in rocks by geophysical methods, for the purpose of determining the strength and predicting the failure of rock pillars and arches in mines.

The Bureau of Mines has been credited with making the first actual measurements of vibrations induced in rock columns under variable loading. Results of the year's work by consultants were encouraging enough to warrant the assignment of a full-time physicist to this investigation. The research is designed to promote safety in mining and to determine in specific instances how much ore must be left for mine support.

Further study of dust produced by mining operations at Mount Weather resulted in some preliminary conclusions that were published by the Bureau's Safety Division.

Nonmetal mining.—Two engineers spent about half their time in the field visiting quarries. They studied quarry-operating methods, with especial reference to drilling, blasting, loading, and haulage practices, involving the making of detailed time studies. The results were tabulated and copies forwarded to the operator in each instance.

An information circular on the technical phases of mineral-wool production was issued, and manuscript for a bulletin—Sand and Gravel; Prospecting, Development, and Excavation—was completed.

Field tests of seismic vibrations set up by blasting in quarries were continued, and two progress reports interpreting the results were published. Three additional papers describing various phases of the vibration problem were prepared for technical journals. Blasting tests were made in the tunnel at Mount Weather, where explosive charges were increased until the resulting vibrations began to have destructive effects on a frame building. Tests for other Government departments were conducted upon request. Numerous improvements and changes were made in testing and calibrating equipment.

Coal mining.—Multiple-shift mechanical mining and rail and truck haulage in strip coal mines were among the problems given consideration. Three information circulars were published during the year—Shaft- and Slope-Bottom Lay-Outs at Coal Mines; Some Aspects of Strip Mining of Bituminous Coal in Central and South Central States; and Multiple-Shift Mechanical Mining in Some Bituminous Coal Mines, Progress Report I. Mines are the laboratories of this section, and the numerous aspects of mine operation are studied to reach conclusions that will help to increase efficiency and promote conservation and safety in coal mining.

Mine ventilation.—Information was gathered on the ventilation of mines and tunnels. A study of the causes, behavior, and control of fires in anthracite mines was continued, and a report based on records of past fires and more recent laboratory research was published as a résumé of the study to date.

The investigation of air-conditioning in mines was extended by means of field trips and analysis of a voluminous literature. Essential factors are being segregated and will be embodied in a forthcoming

paper that will discuss the results of present installations and attempt to define the limits of successful application.

Mineral industries survey.—Six circulars on separate districts or counties were published, and a study of the southern section of the Mother Lode of California (Calaveras, Tuolumne, and Mariposa Counties) is being made. A bulletin on Mining in Calaveras County has been completed and is now in press. Of especial interest are the conclusions of the authors regarding the potentialities for an expansion in drift-mining operations on placer deposits by employing modern equipment and mechanized mining methods. Field work was begun in Tuolumne and Mariposa Counties.

Electricity and machinery.—Inspection and tests for permissibility under Bureau of Mines schedules resulted in the formal approval of 64 pieces of equipment. Eight coal-cutting machines, 2 slate-cutting machines, 4 loading machines, 11 conveyors, 1 caterpillar truck, 1 room hoist, 1 mine pump, 1 rock-dust distributor, 1 hand lamp, 1 flashlight, 5 single-shot dry-cell blasting units, and 1 multiple-shot generator-type blasting unit passed the severe tests; and 17 motors, 4 starters, 2 junction boxes, 2 headlights, 1 headlight resistor box, and 1 control station were found suitable for use on permissible machines. Moreover, numerous changes in the design of explosion-proof compartments were reviewed and authorized. Following a study of fuels for use in flame safety lamps, specifications were drafted covering requirements for a satisfactory fuel. Mechanical and electrical hazards, other than the ignition of gas and dust, connected with the operation of machinery in mines, were studied, and data were assembled on (1) guards for the bits of cutting machines, (2) automatic couplers and brakes for mine cars, and (3) selection and care of mine hoisting rope. Four reports of investigations and three information circulars were published.

Conclusions.—Present types of investigation should be continued and, as in the past, they should be flexible enough to meet changing conditions and to consider subjects of timely and more pressing interest when they arise.

Metallurgical Division

The Metallurgical Division has made notable progress in its program of developing processes to the point where private industry is willing to undertake their commercial application. For example, a license has been issued to use the procedure developed by the division for electrolytic production of pure metallic manganese from low-grade ores; this method is expected to play an important role in the utilization and conservation of domestic manganese ores. The process devised for the chlorination of chromite and its subsequent gaseous reduction to pure metallic chromium has reached the stage where

industrial application is virtually assured. Other especially promising processes in various stages of development include the mechanical concentration of gases, the precipitation of fume by vibrational waves, the desulphurization of iron by special reagents, the use of positive-ion reagents in flotation, and the production of metallic magnesium. The preparation of high-manganese alloys having widely different properties provides a basis for the prediction that these alloys will fill a real need in diversified industries and may prove especially useful for naval purposes.

A more comprehensive summary of the work and a list of publications of the Metallurgical Division is contained in its annual report, published as a Bureau of Mines report of investigations.

Metallurgical fundamentals.—The work comprised experimental determinations of fundamental thermodynamic constants and the demonstration of their application to practical metallurgical problems.

Former studies included low-temperature specific-heat measurements upon manganese and its compounds with metalloids of the sixth periodic group, upon beryllium oxide (a difficultly reducible material), and upon sodium disilicate and silicate, with reference to the properties of slag systems. Dissociation-pressure and calorimetric measurements of the heat of setting of calcium sulphate hemihydrate have been completed; these are important technically with respect to the control of conditions accompanying the manufacture and use of gypsum plaster.

A practical demonstration of the production of pure sponge chromium, with controlled grain size, has been made on a laboratory scale, and the possibility of making a superior-quality product free from carbon, starting with low-grade domestic ores, has been successfully established. Mechanical methods of concentrating mixed gases containing constituents of different gas densities have been developed in detail, and with great success, through the laboratory stage, and studies necessary to their adaptation to technical use are nearly completed.

Metallurgy of steel.—The study of slag-metal reactions in the steel furnace has been promoted by developing equipment for making quantitative magnetic measurements and by working with synthetic slags.

The construction of a portable apparatus for determining coercive force has made experimentation possible in a steel plant; this resulted in establishment of a method for determining carbon in steel that is about three times as rapid as chemical methods.

Blast-furnace studies.—A new method of desulphurizing blast-furnace iron, steel, and scrap metal—involving treatment of the molten metal with calcium carbide and common salt—has been devised and may be of considerable value to the industry. Other studies on de-

sulphurization involved investigations of equilibria conditions in lime-silica-iron sulphide slags.

Special studies.—The results of the Division's mineral physics studies continue to be a basis for practical developments in widely divergent metallurgical fields. The coercimeter has evidenced its value for determining the efficiency of grinding and for shop control at steel plants. Work on the development of practical methods of obtaining high-frequency sound waves for settling dust and fume has proceeded at a rate commensurate with the limited provision for equipment and personnel.

Ore dressing.—Several problems of rather wide application have received special attention. A process for differential grinding was developed which offers improved possibilities for treating ores of oolitic or granular structure, such as iron ores and carnotites. A method has been devised for the flotation of a lead-zinc-fluorspar ore that permits separation of all of these constituents in marketable fractions. A pilot plant where this procedure will be tested is being built by private interests, and a mill for commercial operation will be erected later. A study of the application of both cationic and anionic wetting agents to flotation has reached an advanced stage.

Precious metals.—Investigations of the treatment of gold and silver ores have been continued. A mill of 100 tons daily capacity has been erected in Nevada to treat arsenical gold ores by a process developed in the Division's laboratories.

Nonferrous metallurgy.—Microscopic studies have shown the way for successful procedures in dressing various complex ores. Experiments on the effect of diluents on sintering lead concentrates are being continued as the limited facilities permit.

Ore testing.—In addition to ascertaining preferred methods for treating many types of ores from various districts, procedure for the volumetric determination of molybdenum has been developed and the results prepared for publication.

Copper metallurgy.—Studies of various methods for recovering sulphur from smelter smoke were continued. The absorption capacities and regenerative properties of amine solutions indicate that they may be used effectively for this purpose.

Electrometallurgy.—The principal features of the electrometallurgical work were the virtual completion of the laboratory at Boulder City, Nev., and the final development of a process for the production of manganese of 99.7-percent purity. This process has received United States Patent 2119560, of June 7, 1938, and has been assigned to the United States Government as represented by the Secretary of the Interior. The process is believed to be worthy of industrial application, and details have been prepared for publication. Briefly, an ore is crushed and ground, roasted, and leached; the metallic manganese

is electrodeposited from the purified electrolyte and the spent electrolyte is strengthened and used as the leaching solution. The power consumed is 3 to 4 kilowatt-hours, and the cost for large scale production is estimated at 6 to 7 cents per pound of metal.

A preliminary investigation has shown the feasibility of concentrating a Washington magnesite ore by flotation, and experiments are under way to develop a method for the economic production of pure metallic magnesium which, if successful, would go far toward establishing an industry in the Northwest capable of providing a lightweight metal for airplane construction and similar uses.

Other electrometallurgical work was concerned with the treatment of antimony metal and gold-antimony ores, the production of alumina from alunite, the treatment of copper-nickel ore, and the possible uses of certain minerals of the Boulder Dam region, particularly for ceramic ware.

Conclusions and recommendations.—The policy of the Metallurgical Division is to study various phases of metallurgy from their first stages as fundamental investigations, through their interpretation in terms of practical application and the development of treatment methods, to their trial in the laboratory, and if desirable their translation to pilot-plant operation. The results of these investigations supply information for the improvement of present metallurgical practice and act as an incentive for the establishment of new metallurgical industries.

Conferences with those in the industry have disclosed general satisfaction with the investigational program of the Division and with the results disseminated by its published reports. There has been an insistent demand, however, that certain problems be prosecuted at a rate that cannot be attained with present facilities. The most pressing of these problems include studies in nonferrous metallurgy, on the production of metallic magnesium, in developing practical means of producing dust-settling vibrations, in iron ore beneficiation, and on rare and precious metals.

The new buildings at Salt Lake City, Utah, and Boulder City, Nev., authorized by the Congress will provide room for expansion; the principal deterrent in the more active prosecution of these and other important problems on the Division program is lack of adequate funds to provide necessary equipment and additional personnel.

Petroleum and Natural-Gas Division

The Petroleum and Natural-Gas Division is a research organization that deals with technologic problems in the production and transportation of oil and natural gas and in the refining and storage of crude oil. It also operates the Government helium plant at Amarillo, Tex. The activities of the Division are diverse but have the common

objectives of increased conservation and better utilization of petroleum, natural gas, and related resources.

The laboratory and office building at the Petroleum Experiment Station, Bartlesville, Okla., erected with funds supplied by a Public Works allotment, was dedicated in October 1937, and much of the station's research equipment has been installed in the new space. The improved working quarters add greatly to the utility of the station.

Production of petroleum and natural gas.—Contributions to progress with regard to the production of petroleum and natural gas included a method for determining porosities of oil sands and data on porosities of various sands, which had been ascertained by that method; both were described in a published report. Other publications discussed problems relating to edgewater encroachment in oil sands and the flow characteristics and properties of fluids from a well of the so-called distillate type. Many such wells are being developed by drilling to depths that were not feasible a few years ago.

An extensive report on approximately 100 oil and gas fields in Wyoming and one on the porosity of the Sundance sand in the Lance Creek oil field in that State will be published in the near future. Studies are in progress on well spacing and on methods of drilling through troublesome formations, known as heaving shales. Results of research on oil-field emulsions soon will be published in a report giving the latest information on minimizing the formation of emulsions and methods of treating them.

Safety in the petroleum industry.—Records of 2,600 accidents in the Oklahoma petroleum industry during the calendar year 1937, obtained from the State Industrial Commission, were reviewed and analyzed as a basis for a report being prepared for publication.

Natural gas.—Substantial progress was made in solving problems of pipe-line transportation of natural gas; an apparatus developed by the Bureau of Mines for determining the dew point of gases under pressure will be a useful tool for operators, as knowledge of the temperature at which water will condense from a natural gas is important to the gas industry, especially in preventing interruptions of service due to freezing in long-distance transmission lines. The apparatus developed by Bureau engineers can be used to determine this temperature (the dew point) at the pressure in the pipe line or gas system. This device, which also is useful in other research activities, was developed in connection with a study of the nature of hydrocarbon hydrates and means of preventing formation of these troublesome compounds in pipe lines. A number of operators have had duplicates of the apparatus built for use in their operations from the report and drawings issued by the Bureau.

Bureau engineers who devised a new method for ascertaining the compressibility of gases are simplifying the apparatus, so that it may be used for determinations accurate enough for most engineering calculations without the precise manipulation required by the original design.

Engineering field studies.—Three separate but carefully coordinated studies deal with estimation of oil and gas reserves, relations between ultimate recovery and operating methods, and means of improving operating practices. These are: (1) An analysis of production histories of five fields of the Balcones fault-line system of Texas, which are largely depleted, have similar geological conditions, and were developed and operated without production control; (2) a study of the Anahuac field of the Texas Gulf coast—a high-pressure field with a sand reservoir, in the early part of its life, operated under controlled methods with modern engineering practice; and (3) studies of limestone-reservoir fields of southern New Mexico. Similar work has been started in the Rodessa field, Louisiana.

Oil-field brines.—Difficulties experienced by operators when injecting oil-field brines into salt-water-bearing strata, to avoid damage to lands and pollution of fresh water, led to requests that the Bureau make detailed studies of several plants, with a view of improving designs and practices. Clogging of the disposal formation was found to be caused by carbonates precipitated from solution and by corrosion products carried in suspension into the well bore. Chemical studies were made of the turbidity and stability, and physical tests of the corrosiveness, of brines from seven different brine-conditioning systems.

Chemistry and refining of petroleum.—Two additions to the series of gasoline-survey reports, prepared with assistance from the Cooperative Fuel Research Committee, were published during the year. Manuscripts also were published embodying analyses of crude oils from California, New York, Pennsylvania, Wyoming, and Montana, as well as Bulletin 401, Properties of Typical Crude Oils from Fields of the Eastern Hemisphere. A report on chemical and refining studies of Wyoming black oils will soon be available, and a manuscript on asphalts from Oregon Basin (Wyo.) crude oil is in preparation.

Helium production.—The Amarillo plant produced 6,100,000 cubic feet of helium in the fiscal year 1938—an increase of 1,300,000 cubic feet over the previous year—mainly for use by the Army and Navy in nonrigid airships. Helium was supplied to the United States Public Health Service for medical studies, the National Bureau of Standards for research, and the Weather Bureau for inflation of small meteorological balloons. The Weather Bureau has requested 450,000 cubic feet of helium for this purpose during the next fiscal year.

The amendatory Helium Act approved September 1, 1937, authorized the Bureau to sell helium for medical, scientific, and commercial use; regulations governing sales were approved by the President January 14 and amended with the President's approval March 10, 1938. Approximately 70,000 cubic feet of helium was delivered during the year for non-Government use, and helium-oxygen mixtures for treatment of respiratory diseases are now available in all sections of the United States. Helium now is sold at the Government plant at a fraction of its former cost for private use, and several contracts have been executed for deliveries of helium for the authorized purposes during the coming fiscal year.

Conclusions and recommendations.—The value of the Division's work is evidenced by the whole-hearted cooperation of the oil and gas industry and by unabated requests for more studies than can be undertaken with the funds and personnel available. The \$253,000 in Federal appropriations for the Division's oil and gas studies, supplemented by various facilities and about \$63,000 in cooperative funds supplied by States and other agencies, permits the Division to undertake only a fraction of the work that should be performed to promote conservation of petroleum and related resources. An obvious need is a larger staff in the field, with a small increase in the personnel at the Washington office to facilitate administration of the program.

An engineering building is needed at the Bartlesville station. Such a building was included in the original plans for construction at that station under the Public Works Administration allotment, but increased building costs required its elimination when the contract was let. Moreover, additional gas wells are needed on the Government's helium-bearing gas lands at Amarillo to prevent damage to existing wells through overdraft.

Nonmetals Division

The facilities of the Nonmetals Division have been increased encouragingly by new experiment station buildings at College Park, Md., and Tuscaloosa, Ala., built by funds made available by Public Works Administration allotments.

Froth flotation and utilization of new cationic reagents have made possible the following mineral separations: Diatomaceous earth from clay, spodumene from quartz feldspar and mica, vermiculite from associated gangue, feldspar from quartz, tremolite from talc, tremolite and serpentine from dolomite, gypsum from anhydrite and dolomite, clay from feldspar, mica from feldspar and quartz, and many others. A spectrographic method of quantitative analysis has been developed that is particularly applicable to rocks and rock minerals.

Plasticity of dispersions.—An important but little-known property of minerals is the plasticity of their dispersions. This subject has

been studied at the Eastern Experiment Station in a fundamental way from the standpoint of a relation between stress and deformation. Broad generalizations relating to the plasticity of mineral dispersions have been derived, and a more thorough understanding of the factors involved in the utilization of various types of minerals has resulted.

Southern barite.—Eleven barite ores from Alabama, Tennessee, North Carolina, and South Carolina were tested; three were of marketable grade and required no concentration, one was of such low grade that a salable barite concentrate could not be produced, and seven yielded high-grade concentrates.

Concentration of kyanite.—An extensive study of kyanite, an aluminum silicate occurring as an accessory mineral in gneiss and mica-schist, has been under way for 3 years, and during 1939 a report on all phases of kyanite mining and beneficiation will be submitted for publication. Froth flotation is the most reliable method of concentration, and the trade is demanding the fine sizes of kyanite to an increasing extent.

Beneficiation of clays.—Clays can be improved to some extent by flotation, although dispersion and sedimentation are the best methods of improving many of them. A study of ball clays has been initiated to make available materials suitable for ceramic dry mixes. Processing and beneficiation methods have been developed that will permit a certain Alabama kaolin to enter the paper-filler and coating trade.

Utilization of olivine.—According to Dana, olivine, a member of the chrysolite group, is an "orthosilicate of magnesium, with varying amounts of ferrous iron; a rather common rock-making material, varying from an accessory character to that of a main constituent of the rock." A new use for it—substitution for foundry sand in districts where silica sand is expensive—appeared feasible as a result of foundry casting tests with molds prepared from crushed olivine obtained at large deposits in the Pacific Northwest.

In the third year of study of olivine from northwestern Washington, at the Northwest Experiment Station, quarried and artificially shaped blocks were tested at high temperatures under load and in contact with basic slags, portland cement dust, and waste wood ash. The quarried block showed the best resistance to load and slag. The next best was a mixture of coarse olivine granules bonded with powdered olivine that contained 25 percent magnesium to raise its refractoriness, since the heat-resisting properties of the olivine decrease with the particle size. These synthetic mixtures showed good resistance to load at high temperatures and to the action of portland cement, but poor resistance to waste wood ash and thermal shock. Molding under pressures of several tons per square inch produced a better structure and resistance.

Utilization of coal refuse.—Coal refuse and bone coal are mine wastes too high in ash for fuel. Studies are in progress to devise some means of heat and chemical treatment that will adapt this material for use in water-supply treatment to remove obnoxious tastes and odors.

Boiler-water studies.—The investigation of various waters that cause embrittlement of boiler steel has been very fruitful. A number of substances in the water besides silica have been found capable of causing steel cracking, lead being the most potent. The study of protection against this undesirable action likewise has been most successful. Certain organic materials, including some classes of tannins and the sulphite paper-mill lignin, have shown excellent protective qualities. During the coming year these discoveries will be applied to boilers in commercial operation. A comprehensive summary bulletin on the subject is in preparation.

Conclusions and recommendations.—The demands for improved quality in products made from nonmetallic minerals and the desire to substitute domestic for imported raw materials because of the uncertainty of foreign supplies necessitate research in the preparation and utilization of this widely occurring group of minerals. Results can be achieved most economically by the Nonmetals Division, whose experience is wider in scope than any single industry can attain. This work should be prosecuted with vigor to accelerate development of new industries in the Southeastern States and in the Pacific Northwest.

Explosives Division

The Explosives Division continued its research and test work on the explosibility of gases and vapors and upon the properties of explosives, particularly those studies relating to the suitability and permissibility of explosives for use in mining.

Gas explosions.—The study of gas explosions included further development of calculation of the explosibility of complex gaseous atmospheres containing propylene, air, nitrogen, and carbon dioxide; and derivation of data on the amounts of inert gas required to render various combustibles nonexplosive and on oxygen concentrations below which combustibles are incapable of propagating flames.

Experiments on explosion hazards in underground manholes were continued, and fires and explosions in manufacturing plants were investigated. Questions relating to the combustibility and explosibility of material sent through the mails were answered.

Mine fires.—In the study of mine fires, inflammabilities of the gaseous distillation products from heated anthracite were ascertained, and the disappearance of carbon monoxide from sealed mine areas was shown to be due, in part, at least, to the action of micro-organisms.

Poisonous gases from explosives.—Experiments upon the emission of toxic gases from certain explosives were continued. Deteriorated

explosives were shown to give increased quantities of oxides of nitrogen.

Liquid-oxygen explosives.—A cooperative study developed methods for reducing the inflammability of liquid-oxygen explosives without loss of explosive qualities.

Mechanism of ignition of explosive gas mixtures by explosives.—The conditions governing ignition of gases by explosives are being studied. The action of incandescent particles has been given major attention.

Explosive and toxic hazards from Diesel engines underground.—The Explosives Division, in cooperation with the Health Division, has begun a study of the exhaust gases from American Diesel engines.

Testing explosives.—Sixteen explosives were tested for permissibility in coal mines; 13 of these passed all the required tests. A total of 576 gallery tests and 1,657 other control tests was made at Bruceton, Pa. The Explosives Chemical Laboratory at Pittsburgh made 177 chemical analyses.

Conclusion and recommendations.—The continued occurrence of fatal and costly accidental explosions in industry and in homes, owing to misuse of explosives and ignorance of the potential dangers from explosive mixtures of combustible gases and vapors with air, attests the necessity for increasing vigilance by the Explosives Division in advising and warning manufacturers and other users regarding these hazards.

Principal Mineralogist

Review of work.—Prospectors and others who find mineral specimens that they cannot identify turn to the Bureau of Mines for help. The micas, with their shining cleavage faces—especially weathered biotite, which displays an almost metallic brassy or bronzy luster—are the minerals most often submitted for identification. Pyrite, whose deceptive yellowish metallic luster causes the uninitiated to mistake it for gold, ranks second in number of samples received. Although many of these specimens have little or no value, some unusual and economically important minerals have been identified. These include dakeite (a recently described uranium-radium mineral from a new locality, near Winnemucca, Nev.), columbite, beryl, and others. The principal mineralogist examined and identified more than 2,000 specimens and answered over 1,000 inquiries concerning mineral deposits.

In addition, he consulted with industrial engineers and members of the Bureau staff on problems related to the utilization of minerals. During the year he also inspected deposits of spodumene in Massachusetts and of spodumene and other minerals in North Carolina; he is endeavoring to create interest in the use of spodumene and of spodumene-bearing pegmatite in the ceramic industry, for which these minerals seem to be especially adapted.

ECONOMICS AND STATISTICS BRANCH

The Economics and Statistics Branch collected and published data on the production and consumption of all principal mineral commodities and prepared reports giving the results of special economic studies; it also prepared the annual publication entitled "Minerals Yearbook," which appears both as a complete bound volume and as separate chapters. The branch comprised the Coal Economics, Petroleum Economics, Mineral Production and Economics, Metal Economics, Nonmetal Economics, and Foreign Minerals Divisions.

Coal Economics Division

The Coal Economics Division maintained uninterrupted its current and annual statistical publications on the solid mineral fuels (with the exception of bituminous coal), notwithstanding the transfer on July 1, 1937, of two-thirds of its personnel and operating funds to the National Bituminous Coal Commission.

Service to the solid mineral-fuel industries.—This service comprised:

(1) The collection of data on the production, distribution, and use of anthracite, semianthracite, lignite, coke, fuel briquets, packaged fuel, and peat; preparation of the corresponding statistics; and their weekly, monthly, and annual publication in appropriate form.

(2) Answering of inquiries by mail, telephone, and personal call.

(3) Completion and publication of Distribution of Byproduct and Beehive Coke in 1936, a 26-page mimeographed report.

Economic studies.—No special economic studies could be made during the year, as all of the personnel was fully occupied in maintaining the statistical routine and all trained economists had been transferred to the Coal Commission. The situation in this respect should be slightly better during the current fiscal year, as the personnel has now become familiar with its reallocated duties and should have a slight margin of time available for special studies. In spite of this, without restoration of some of the funds transferred to the Commission when the work on bituminous coal was split off from the Coal Economics Division, any important economics study will have to be done largely on overtime.

Economics in operation.—Several years ago the Coal Economics Division, lacking adequate funds of its own, adopted the policy of accepting statistical data collected by certain trade agencies. This procedure was continued through the past fiscal year, the Market Statistics Unit (later organized as the Bureau of Research and Statistics) of the National Bituminous Coal Commission being added as an acceptable agency for certain distribution and stock data on anthracite and coke. These data continue to be collected by clerks transferred from the Bureau of Mines and familiar with its work; the

information is included in uninterrupted combination canvasses (that is, bituminous coal-anthracite-coke).

Needs of Division.—Transfer of the major part of the personnel of the Division to the National Bituminous Coal Commission reduced appropriations to a point that has made it extremely difficult to continue the functions assigned by the Congress. To meet the requirements, additional funds should be appropriated for the Division's work.

Prospective studies.—*Anthracite.*—Pennsylvania anthracite production has been dropping for about 15 years. The causes are both economic and technologic. The remedies for the ills of the anthracite industry lie in the same categories, but to date have not been worked out and applied broadly enough to be effective, if indeed they could be made effective in view of the present lack of control over some of the opposing forces. Study of this important problem as a whole is entirely beyond the present resources of the Coal Economics Division; however, it can and will continue to prepare statistics on production, distribution, and use that may be of assistance in solving the problem. Production statistics are already on a high plane of accuracy and completeness and will be maintained so by constant watchfulness. Distribution statistics are somewhat incomplete and sources of data largely secondhand. Special effort will be exerted in 1939 to raise them to a satisfactory standard. Consumption (use) statistics also are not well developed.

Coke.—Present statistics on byproduct coke are highly accurate as to production, but weak on transportation and distribution. The publication of distribution data annually (as in the report for 1936) would be useful to all concerned in the coke industry. Long intervals between reports, as at present, decrease their usefulness. Promptly issued information on the current movement of coke in commerce (transportation tables) would also be useful to both producers and consumers. Studies of the economics of the byproduct industry, such as supply, and present and potential demand, would also be valuable.

Petroleum Economics Division

The Petroleum Economics Division collected statistics on the production and consumption of petroleum and natural gas and their major products, assembled data and answered inquiries on all economic phases of these industries, and prepared monthly forecasts of demand.

Forecasts of demand.—The monthly forecasts of demand for motor fuel and crude petroleum continued to be a major feature of the



NEW BUREAU OF MINES BUILDINGS.

UPPER: PETROLEUM EXPERIMENT STATION AT BARTLESVILLE, OKLA.

MIDDLE: EASTERN EXPERIMENT STATION, COLLEGE PARK, MD.

LOWER: SOUTHERN EXPERIMENT STATION, TUSCALOOSA, ALA.

Division's work. These forecasts are of general interest to the industry and are particularly useful to the various State conservation agencies, as they contain the information necessary in devising programs to avoid waste and needless storage of crude petroleum. Revision of the form of the weekly crude-oil stock reports to show data by States as well as by districts has made possible current determination of the market demand for crude.

Field offices.—An additional appropriation was made available for strengthening the field work of the Division and for conducting special studies during the next fiscal year. In addition to the present office in California, a new office will be established in Oklahoma.

These offices will facilitate close contact with the field operations of the industry and with the activities of the various State agencies dealing with oil and gas; they will moreover serve as headquarters for field investigations.

Special studies.—Completion of an initial survey of crude-oil stocks, as of June 30, 1936, indicated that, in spite of losses in gasoline content, the average quality of crude oil in storage was surprisingly high, because such stocks generally represented flush production from new fields and there has been a remarkable improvement in storage facilities. The Division is prepared to continue a study of the economic relation of necessary working stocks to above-ground storage and underground reserves.

In connection with trends in market demand for crude by producing States, a more detailed investigation of crude runs, by refinery districts, and of interregional shipments of finished gasoline will be undertaken. These surveys should prove of particular interest and value to the industry.

Mineral Production and Economics Division

The Mineral Production and Economics Division collected production statistics for metal mining in the United States; supervised the compilation of the annual volume—Minerals Yearbook; gathered and analyzed the usual statistics on employment, accidents, and explosives as related to mining; and, in cooperation with the Works Progress Administration, continued the study of changes in mineral technology and output per man.

Metal-mine statistics.—Preliminary reviews of metal mining in the 13 Western States that produce nonferrous metals were released between January 10 and January 19. These were followed by summary reports on gold, silver, copper, lead, and zinc. By the end of June, final detailed statistics for metal mining were completed for all States except Arizona.

Minerals Yearbook.—Minerals Yearbook, 1937, was issued in August 1937. The volume included several general chapters as well as the customary commodity reviews and comprised 1,502 pages. Demand for this annual official review of the mining industry has been unabated.

The manuscript for Minerals Yearbook, 1938, was submitted for transmittal to the Public Printer on June 25, 1938. Because of the necessity for keeping within the printing budget, the size of the volume was reduced to 1,339 pages. This edition contains detailed final figures for 1937 that cover all mineral commodities but bituminous coal, coke, petroleum, natural gas, and natural gasoline. Final statistics on Pennsylvania anthracite, stone, sand and gravel, cement, and lime are presented for the first time in any Yearbook.

Each chapter that was completed before June 10 was issued as promptly as possible as a preprint, instead of waiting to reprint the material after the Yearbook is issued. Some such chapters were thus published early in May, and 47 had been printed and distributed before the volume was off press.

Employment and accidents.—The division made its annual statistical surveys of the causes of accidents and the number of men employed at mines and quarries. Owing to lack of comparability of State casualty records due to variations in State laws with regard to classes of mines and types of accidents covered by local legislation, the Bureau of Mines is supplied with voluntary and uniform reports by the operating companies.

Four accident-prevention contests were conducted, with 399 mines and quarries in 39 States participating. Safety trophies were awarded to companies that established the best accident-prevention records, as determined by a statistical analysis of the contestants' reports of accidents and man-hours of exposure to occupational hazards.

Reports were also obtained from manufacturers of explosives showing the quantity used in the mineral industries, the chief consumers of explosives used for industrial purposes in the United States.

Changes in mineral technology and output per man.—In cooperation with the Works Progress Administration, the division continued the study of technologic changes and output per man in selected American mineral industries. Three reports were published during the year. Other reports nearing completion show technologic changes in the petroleum, metal-mining, phosphate rock, and crushed-stone industries and their effect on production and employment.

Conclusions and recommendations.—Although the work of the Division is efficiently conducted, important phases of its activity are necessarily being neglected through lack of the requisite personnel. Additional personnel is needed for compiling the historical record of metal mining and the detailed analysis of statistics on mine accidents, for expanding the collection of accident statistics to include the petro-

leum industry, and for making needed studies of broad, economic problems with which the mining industry is vitally concerned.

Metal Economics Division

The Metal Economics Division serves the mineral industry, various Government agencies, and the public through its statistical and economic surveys of the metal industries. During the fiscal year 1938 the division conducted 55 statistical canvasses, prepared 65 publications, and answered over 2,700 requests for information.

Strategic minerals.—Recent interest in national defense has focused attention on the fact that the United States depends largely upon overseas supplies for such important mineral raw materials as manganese, tin, chromite, tungsten, and other metals indispensable to industry in peace as well as in war. Congressional committees and various executive departments studying deficiency mineral problems have consulted specialists of the Metal Economics Division frequently and have been given the benefit of data collated by them.

Other interested persons not connected with the industry have also made an exceptionally large number of requests for authoritative information on strategic minerals.

Secondary metals.—The importance of scrap as a source of metalliferous raw materials has long been recognized by the Bureau of Mines, and it is gratifying to record that the Congress has provided funds that will permit expansion of the Bureau's services to those engaged in the salvaging of waste metals. A secondary metals section will be established at the Bureau's Central Experiment Station (Pittsburgh, Pa.) early in the fiscal year 1939, to assist the secondary metals industry by compiling comprehensive statistics on production, consumption, and flow of scrap metals as well as other data that will contribute to the efficiency of the scrap trade.

Conclusions and recommendations.—The substantial increase in the number of requests for information during the past year demonstrates that the Division is rendering effective service to industry and the public. Its efficiency would be increased substantially if the marketing phases of the metal industries could be investigated more thoroughly. In addition, there is urgent need for data on the industrial uses of silver and the strategic minerals and on consumers' stocks of metals. Funds should also be made available to permit specialists to keep informed of new developments by direct field contact with the metal industries.

Nonmetal Economics Division

Minerals Yearbook chapters.—The Nonmetal Economics Division established a new record in completing statistics and text for the 19 chapters, covering more than 80 commodities, now prepared for

Minerals Yearbook. All final statistics have never been available before until late Autumn; in 1938 individual chapters were in print months ahead of any previous year. This achievement is the more remarkable because, in forming the Division 2 years ago, the staff assigned to fundamental economic and statistical studies of non-metals was smaller than that which formerly handled these subjects. Ability to do more and better work in spite of this handicap may be attributed to careful planning, elimination of requests for unnecessary data, and simplification of questionnaire forms to make them easier for producers to fill out.

Phosphates.—Recognizing the growing public interest in phosphates, the Division in 1937 inaugurated a midyear production canvass and report on phosphate rock, and the annual review was expanded to afford a more complete summary of the industry. Supplementary data were also furnished the joint committee appointed by the Seventy-fifth Congress to study phosphates, and the copious files of the Division will yield additional data if needed.

Publications.—Several articles by members of the staff, including the usual annual summaries of technologic progress, were published during the year by technical and trade journals and professional societies, and five reports were issued as information circulars. Other reports, including two general surveys and several marketing reviews, were completed but await funds for publication.

Service given by division.—As the main repository of information on a diversified group of industries marketing a billion dollars' worth of products a year, the Division is asked to answer monthly 350 to 500 inquiries from the public and more than 30 Government agencies. Organization of a Nonmetals Division in the Technologic Branch and the numerous information circulars prepared by the staff before the 1933 retrenchment have reduced to a minimum the requests that have to be referred to the Nonmetal Economics Division for a special reply.

Conclusions and recommendations.—In addition to maintaining a current record of significant technologic and commercial trends as affecting nonmetallies and gathering statistics thereon, the most important service of the Division is in the marketing field. Lists of buyers of all merchantable minerals are available, and practical help is given small operators daily as to how and where to sell their products. However, the Division is handicapped by shortage of funds in its efforts to make this service as effective as it should be.

Foreign Minerals Division

For at least 2 years world-wide attention has been focused upon the national defense and armament programs of the major world powers. During the past fiscal year the efforts of Germany, Italy,

and Japan and the less intensive attempt of several other nations to attain self-sufficiency as to raw materials were accelerated to such an extent that the economic equilibrium of the world as a whole has become badly distorted. Stringent foreign-exchange-control systems, discriminatory bilateral trade arrangements, and numerous other forms of Government restrictive regulations, now operative in several countries, affect American industry and foreign trade adversely in certain instances.

The problem of acquiring adequate supplies of mineral raw materials, which is common to many foreign countries, must be solved and must be considered a major factor in any analysis of the policies adopted by such countries as Germany, Italy, and Japan and the effects thereof.

Foreign Minerals Quarterly.—To provide factual information on the mineral resources, annual production, foreign trade, and Government control measures regulating the mining and metal-consuming industries in foreign countries, the Foreign Minerals Division in January 1938 published the first issue of *Foreign Minerals Quarterly*. Volume 1, number 1, discussed the mineral resources, production, and trade of eight countries in eastern Europe; subsequent issues described current economic conditions in Germany, Italy, Japan, and the Union of Soviet Socialist Republics.

Foreign mineral specialist.—In July 1937 the Bureau's foreign mineral specialist established headquarters at the American Embassy in Paris, France. In cooperation with the staffs of the American consulates at Paris and Brussels, comprehensive surveys of the mineral resources of France and Belgium and their colonies were prepared. These reports provided the basic material for two issues of the *Foreign Minerals Quarterly*. In May 1938 the specialist transferred his headquarters to London, where he will complete studies on the European iron and steel, copper, lead and zinc, coal, and petroleum industries.

Consular reporting service.—A cooperative arrangement between the Department of State and the Bureau of Mines, whereby the former, through its Foreign Service, supplies voluntary and requested reports on various phases of foreign mineral economics, has proved very helpful and beneficial to the Bureau. During the fiscal year, 2,390 reports were received from Europe; the majority were published from time to time in various monthly and quarterly periodicals issued by the Economics and Statistics Branch.

HEALTH AND SAFETY BRANCH

The Health and Safety Branch, comprising the Health and Safety Divisions, conducted safety training, answered emergency calls for

aid after catastrophes at mines and mineral plants, and studied conditions that affect the health of workers.

Health Division

The work of the Health Division concerned the effect of the working environment on the health of employees in the mineral industries. Studies were conducted on the composition of mine and tunnel air, determination and control of air dustiness, composition of Diesel exhaust gas, compressed-air illness, and respiratory protective devices.

Determination of dust.—Significant progress was made in developing and improving methods for calculating air dustiness. Six papers were published giving the results of this work, which especially emphasized application of the Bureau's midjet impinger for dust sampling. The information thus made available should be of great practical importance in evaluating health hazards in dusty occupations.

Considerable progress was made in developing procedures for determining the composition of air-borne dust. Studies were made of the applicability of petrographic, spectrographic, and X-ray procedures to this problem. This information is of fundamental importance in ascertaining the health hazards of various types of dust.

Dust control.—Four papers on the generation and control of dust from drilling and blasting were published. Much of the work on this problem is being conducted in the Mining Division's testing adit at Mount Weather, Va.

Respiratory protective devices.—Much interest was shown in the Bureau's approval of respiratory protective devices, as evidenced by the fact that 12 new approvals were granted and 6 additional approvals virtually completed. This work of the Bureau helps to assure safe, satisfactory, and reliable respiratory protective devices for use in nearly all kinds of atmospheric contaminants.

Diesel exhaust gas.—Great interest has been shown in the possibility of using Diesel engines in mines and tunnels. To evaluate the health hazards that might be experienced in using such engines underground a study of the composition of Diesel exhaust gas is being conducted in cooperation with the Explosives Division. Approximately 800 samples of gases evolved from use of Diesel engines have been analyzed to date by the Health Division.

Mine gases.—About 1,000 analyses were made during the year of mine gases taken in connection with studies of mine explosions, the control and extinguishing of mine fires, and the promotion of safe and hygienic working conditions in and around mines. Two papers were published, one on gas analysis and one giving pertinent information on mine gases.

Compressed-air illness.—An investigation of possible methods of reducing compressed-air illness has been started in cooperation with

the United States Public Health Service and the Port Authority of New York. The rate of nitrogen elimination from the body when breathing oxygen was determined. This information is a necessary prelude to the development of methods for preventing compressed-air illness.

Safety Division

Personnel.—The Safety Division personnel included 26 engineers, 26 safety instructors, 15 clerks, and 7 other employees, a total of 74. Members of the division were assigned to duty fairly evenly through the various mining States, being headquartered at 17 cities.

Training courses.—In the past year the Safety Division gave the full Bureau of Mines training courses in first aid and mine rescue to 105,093 persons in the mining and allied industries, visiting 690 communities in 38 States, compared with 69,662 persons so trained in 1937. Since its inception in 1910, the Bureau has given its complete courses in first aid and mine rescue to the following numbers of persons, arranged by branches of the mining industry: Coal mining, 835,581; metal mining, 130,280; petroleum industry, 87,587; metallurgical plants, 30,553; nonmetallic mining, 14,845; cement plants, 13,553; tunnel work, 5,950; and miscellaneous mining activities, 28,505—a total of 1,146,854. Those who have taken these courses not only are prepared to render assistance to fellow workmen but are competent to give first-aid treatment to injured persons when off duty. It is estimated that at least 200 lives are saved annually by Bureau of Mines first-aid graduates.

During the past year, 1,902 persons in 30 States qualified to teach first-aid courses and were given provisional first-aid instructors' certificates, raising the total number to 9,454 issued since 1930. Certificates of 100-percent first-aid training were issued to 256 mines or plants in 25 States wherein every person had taken the Bureau of Mines first-aid course; to June 30, 1938, these certificates of 100-percent first-aid training had been issued to 1,910 plants.

In the course of the year, 198 expert mine rescue men took the Bureau advanced course in mine rescue and recovery operations and earned certificates, bringing the total to 3,163. The Bureau accident-prevention course for higher officials in coal mining was given in 5 States to 1,297 officials; in all, 7,659 of these certificates have been issued to mine officials since 1930.

Contact with mining industry.—The 50 men normally engaged in field work of the Safety Division in ordinary years come in contact with more than 300,000 persons in mining and its associated industries, teaching them the results of the Bureau's accumulated knowledge on safety; it is estimated that during the past year, however, the field personnel reached at least 500,000 persons. Only 2 of the 10 all-

steel safety cars were in active use; 41 passenger automobiles and 14 automotive trucks were operated and traveled 727,427 miles.

Mine fires and explosions.—In the course of the year 29 mine explosions in 12 States and 26 mine fires in 12 States were investigated, and the Bureau personnel aided in rescue or recovery work at practically all of these where life was involved. There were 8 major fire or explosion disasters (those in which 5 or more lives were lost); in these, 146 were killed, a substantial increase compared to the previous year; however, even this record is a tremendous improvement when compared to the annual average of 17 major disasters and 562 fatalities from them in the 4 years that preceded establishment of the Bureau in 1910. Without doubt, much of the relative immunity from mine fire and explosion disasters now enjoyed in the United States is due to various phases of safety work promoted by the Bureau. One such activity is the advocacy of rock dusting, a practice now known definitely to prevent the occurrence of many widespread explosions yearly. There is reliable evidence that for the past 8 to 10 years, rock dusting alone has prevented several hundred fatalities annually in United States coal mines.

Fifty-five miscellaneous accidents in 20 States (including those from roof falls, explosives, electricity, and other causes) were investigated, as well as numerous surface explosions of black powder, dynamite, pulverized fuel, and gas.

Mine reports.—Two hundred and thirteen reports were made on safety conditions at individual mines or mineral plants in 31 States during the year. Some of these were transmitted confidentially to the operating company, with constructive criticism of existing conditions and definite recommendations for improvement. These reports, with verbal suggestions by Bureau men during or after the inspections upon which the reports were based, resulted in hundreds of important alterations in operating conditions (equipment, methods, and practices), with resultant favorable influence on the prevention of accidents. Numerous changes of this type have been reported by field men, and several hundred letters were received during the year from mining people voicing appreciation of this and other services.

Other activities.—The personnel of the Safety Division assisted in conducting 74 first-aid contests in 21 States; prepared and conducted 50 safety exhibits and demonstrations in 12 States; attended 625 safety meetings in 33 States; and prepared 60 manuscripts for publication. As a means of disseminating safety knowledge, sound was reproduced on three silent motion pictures and the latter presented before more than 25,000 interested persons, chiefly in the mining industry.

Ten new safety clubs (Holmes Safety Association chapters) were organized in 3 States; in all, 472 of these mining-community safety

organizations have been established, scattered throughout 28 States. Numerous special studies were made of rock dusting, ventilation, electricity, haulage, air conditioning, wetting methods, detecting gases, testing roof, reducing air dustiness, and other health and safety problems of the mineral industries.

Conclusions and recommendations.—The services of the Safety Division are in greater demand than at any time in its history; unfortunately, with its limited personnel only a portion of the requests for help can be filled. The popularity of training in first aid is so great that other important work of the Division has suffered because of the necessity to divert personnel to this activity. The increase in coal-mine explosion fatalities during the past year shows a need for greater educational work on accident prevention, and some of the engineers loaned for first-aid training work last year must be returned to accident-prevention duties; this will leave a shortage of personnel both for first-aid training and for the numerous other activities in which the Division engages.

The accident rate in mining has been much lower during the past 5 years than in any other period in the history of the industry in the United States, insofar as statistics are available. The excellent safety records of numerous individual mining companies, working under hazardous conditions, show definitely that mine accidents in this country can be reduced at least 75 percent below their present rate if known feasible practice is followed strictly. It is the unswerving ambition of the Safety Division to assist in bringing about this reduction.

ADMINISTRATIVE BRANCH

The Administrative Branch comprised the Information and Office Administration Divisions.

Information Division

The work of the Information Division included the editing and distribution of publications, supervision of motion-picture production and circulation, maintenance of the Bureau library, and preparation of exhibits.

Editorial.—During the fiscal year 13 bulletins, 12 technical papers, 1 miners' circular, 70 separate chapters comprising Minerals Yearbook, 1938, 1 schedule, 1 cumulative list and index of publications, 12 monthly lists of publications, and 1 motion-picture list were edited and sent to the printer—a total of 111 printed publications. Moreover, during the year 70 chapters from Minerals Yearbook, 1937, were prepared for publication, and 11 other publications were reprinted. Owing to lack of printing funds, however, only a part of the Bureau's output could be printed at Government expense; consequently, 187 papers were submitted for publication in the technical and trade press.

The editorial section also edited 58 reports of investigations and 66 information circulars, papers that supply promptly to the mining industry and the general public results of Bureau investigations that are usually described in detail in later printed reports, or that give salient facts on the mineral industries in concise form suitable for use in reply to queries. In addition, 16 periodical and miscellaneous reports were edited.

These reports, 519 in all, involved the editing of 23,528 pages of manuscript.

Publications.—During the fiscal year, 196,375 copies of the free editions of Bureau publications and approximately 300,000 reports of investigations, information circulars, and monographs were distributed by the publications section. These were sent, however, only as the result of a direct request either for a specific publication or for all publications on a particular subject. In addition, the Superintendent of Documents sold about 100,000 copies of the Bureau's printed reports.

Numerous brief statements announcing the issuance of new publications or describing current investigations were supplied to the daily and technical press. These short items were printed widely and effectively acquainted the public with the results of the Bureau's work.

More than 72,000 letters requesting publications or information on the Bureau's activities and general mining subjects were received and answered.

Motion-picture production.—As a means of disseminating information on safety and efficiency in the mineral industries, the Bureau maintains what is perhaps the largest library of educational motion-picture films in the world. These films are prepared under the supervision of the division, through the cooperation of industrial concerns that bear the entire cost of production and that of providing copies for distribution.

During the year, three new film subjects were added to the library, and seven subjects were revised.

Motion-picture circulation.—Circulation of the Bureau's motion-picture films, and other graphic services, such as drafting and photography, are centralized in the Pittsburgh Experiment Station, but there are 16 subdistributing centers for films throughout the country, selected with regard to accessibility. The films are loaned to schools, churches, civic and business clubs, miners' local unions, and similar organizations. No charge is made for use, but exhibitors are asked to pay transportation charges. On June 30, 1938, the Bureau had 2,164 sets of films, including 4,095 reels, aggregating 2,182,530 feet. During the year the films were shown on 102,637 occasions to an attendance of 10,351,700 persons. The attendance was 15 percent higher than in the fiscal year 1937.

Library.—The year's accessions to the library comprised 3,884 books and pamphlets, 364 periodicals were received currently, and 778 books were loaned for use outside the library.

Exhibits.—The division prepared, installed, and supervised, at expositions and conventions, 11 exhibits illustrating Bureau activities.

Office Administration Division

The Office Administration Division is charged with handling personnel matters, property records, accounting, multigraphing and mimeographing, and general administrative routine.

Property.—Records of the Bureau, as of June 30, 1938, show the following valuation of Bureau property:

Automobiles and trucks.....	\$101, 169. 26
Canvas and leather goods.....	3, 576. 77
Drafting and engineering instruments	12, 357. 29
Electrical equipment.....	47, 508. 88
Hardware and tools.....	37, 708. 33
Household equipment.....	20, 532. 96
Laboratory apparatus.....	556, 087. 76
Medical equipment.....	13, 800. 05
Office furniture and equipment.....	371, 032. 04
Photographic apparatus.....	36, 922. 03
Machinery and power plant equipment.....	1, 081, 285. 03
Land, buildings, and improvements.....	2, 511, 911. 48
Rescue cars and specialized apparatus.....	414, 157. 93
	<hr/> 5, 208, 049. 81

This property is in Washington and at the various field stations and offices of the Bureau.

Personnel.—On June 30, 1938, there were 737 full-time employees on duty in the Bureau, distributed as shown in the following table:

	Classification and number of appointees				
	Profes- sional	Subprofes- sional ¹	C. A. F.	Custodial ²	Total
Washington.....	³ 37	3	137	9	186
Pittsburgh.....	⁴ 95	39	61	46	241
Field.....	⁵ 157	44	62	47	310
Total.....	289	86	260	102	737

¹ Includes instrument makers, safety instructors, laboratory aids, assistants, etc.

² Includes laborers, mechanics, messengers, etc.

³ Engineers, 16; chemists, 3; miscellaneous, 18; total, 37.

⁴ Engineers, 45; chemists, 31; miscellaneous, 19; total, 95.

⁵ Engineers, 80; chemists, 32; miscellaneous, 45; total, 157.

141

66

82

289

In addition to the foregoing full-time employees, the following 54 employees held appointments on a when-actually-employed basis: 54 consultants; 59 excepted; 12 classified; 5 unclassified, and 24 employed on field agreements. This brings the total enrollment to 991 employees.

FINANCES

The total funds available to the Bureau of Mines for the fiscal year ended June 30, 1938, including direct appropriations, departmental allotments, reappropriated balances, and sums transferred from other departments for service work, were \$2,421,880.61. Of this amount \$2,368,863.25 was spent, leaving an unexpended balance of \$53,017.36. On the regular work of the Bureau, \$2,291,514.45 was expended. This figure is subject to slight corrections due to unpaid obligations.

Table 1 presents classified and complete information regarding the financial history of the Bureau since its establishment in 1910.

Tables 2 gives a statement of the distribution of Congressional appropriations to the branches and divisions and the expenditure of these funds in 1938, by Bureau divisions.

TABLE 1.—Bureau of Mines Appropriations and Expenditures, Fiscal Years Ended June 30, 1911–38

Fiscal year	Appropriated to Bureau of Mines	Departmental allotments ¹	Funds transferred from other departments ²	Total funds available for expenditure	Unexpended balances	Total expenditures	Expenditures exclusive of service items ³
1911.....	\$502,200.00	\$34,200.00	-----	\$536,400.00	\$22,818.27	\$513,581.73	\$513,581.73
1912.....	475,500.00	45,640.00	-----	521,140.00	6,239.77	514,900.23	514,900.23
1913.....	583,100.00	47,850.00	-----	630,950.00	4,087.20	626,862.80	626,862.80
1914.....	664,000.00	57,307.79	-----	721,307.79	4,678.29	716,629.50	716,629.50
1915.....	730,500.00	55,424.60	-----	785,924.60	4,178.11	781,746.49	781,746.49
1916.....	757,300.00	48,710.87	-----	806,010.87	9,058.63	796,952.24	796,952.24
1917.....	981,060.00	52,400.00	-----	1,033,460.00	48,588.10	984,871.90	984,871.90
1918.....	1,457,070.00	51,901.98	\$3,062,000.00	4,580,971.98	395,745.10	4,185,226.88	1,172,939.64
1919.....	*3,245,285.00	49,542.86	*8,600,000.00	11,894,827.86	2,452,236.78	9,442,591.08	1,137,471.37
1920.....	1,216,897.00	52,800.00	-----	1,269,697.00	9,592.18	1,260,104.82	1,245,891.36
1921.....	1,362,642.00	62,618.72	666,720.00	2,091,980.72	13,985.89	2,077,994.83	1,412,923.15
1922.....	1,474,300.00	59,800.00	182,200.00	1,716,300.00	52,120.45	1,664,179.55	1,483,038.47
1923.....	1,580,900.00	70,814.30	97,100.00	1,748,814.30	10,959.08	1,737,855.22	1,640,840.57
1924.....	1,784,959.00	50,710.00	347,820.00	2,183,489.00	38,085.43	2,145,403.57	1,804,800.41
1925.....	2,028,298.00	57,500.00	236,465.86	2,322,233.86	107,743.20	2,214,490.66	1,998,669.20
1926.....	1,875,010.00	81,220.00	510,501.15	2,466,731.15	28,891.78	2,437,839.37	1,841,150.80
1927.....	1,914,400.00	94,443.39	325,000.00	2,333,843.39	44,871.29	2,288,972.10	1,926,910.12
1928.....	3,025,150.00	113,266.45	323,000.00	3,466,416.45	7736,235.62	2,730,180.83	1,997,270.66
1929.....	2,725,118.00	103,000.00	205,500.00	3,033,618.00	8152,701.34	3,600,393.33	2,280,960.68
1930.....	2,274,670.00	123,300.00	165,200.00	2,563,170.00	9135,714.93	2,548,671.45	2,216,995.72
1931.....	2,745,030.00	120,680.91	166,500.00	3,032,210.91	10195,534.37	2,939,060.73	2,304,121.45
1932.....	2,278,765.00	137,866.48	194,500.00	2,770,712.18	11344,689.43	2,426,022.75	2,186,799.92
1933.....	1,860,325.00	75,100.00	184,000.00	2,119,425.00	12475,895.41	1,885,243.55	1,710,949.42
1934.....	1,574,300.00	50,230.00	17,000.00	1,872,586.00	13397,131.28	1,475,454.76	1,254,846.72
1935.....	1,293,959.07	50,090.00	126,513.10	1,520,472.17	1434,154.47	1,486,317.70	1,349,490.11
1936.....	1,970,311.00	69,500.00	47,570.00	2,114,966.51	1514,074.34	2,100,892.17	2,052,751.87
1937.....	2,093,200.00	69,060.00	65,000.00	2,227,812.45	168,132.14	2,221,680.31	2,162,887.03
1938.....	2,222,450.00	83,000.00	62,300.00	2,421,880.61	1753,017.36	2,368,863.25	2,291,514.45
1939.....	2,808,735.00	87,790.00	60,000.00	2,995,221.70	-----	-----	182,358,550.00

¹ Includes printing and binding, stationery, and contingent funds.

² Includes proceeds from sales of residue gas.

³ Service items include Government fuel yards, helium, and other investigations and services for other departments.

⁴ Includes gas investigations for War Department.

⁵ Includes \$1,586,388 for Government fuel yards.

⁶ Includes War Minerals Relief Commission, \$8,500,000.

⁷ Includes \$719,476.67 unexpended balance reappropriated.

⁸ Includes \$120,216.38 unexpended balance reappropriated.

⁹ Includes \$102,354.19 unexpended balance reappropriated.

¹⁰ Includes \$159,580.70 unexpended balance reappropriated.

¹¹ Includes \$241,713.96 unexpended balance reappropriated.

¹² Includes \$231,056.04 unexpended balance reappropriated.

¹³ Includes \$50,000 unexpended balance reappropriated.

¹⁴ Includes \$27,585.51 unexpended balance reappropriated.

¹⁵ Includes \$2,612.45 unexpended balance reappropriated.

¹⁶ Includes \$3,819.17 unexpended balance reappropriated and \$40,311.44 receipts from sale of helium and other products.

¹⁷ Includes \$41,696.70 unexpended balance reappropriated.

¹⁸ Estimate.

TABLE 2.—Bureau of Mines Expenditures, Fiscal Year 1938

Branch or division	Con- gen- eral ex- penses	Operating rescue cars and stan- dards in- vestiga- tions of accidents	Testing fuel	Mineral mining investi- gations	Oil and gas in- vestiga- tions	Expenses mining exper- iment stations	Econom- ics of mineral indus- tries	Care, etc., build- ings and grounds, Pitts- burgh, Pa.	Ac- quire- ment of land, helium plant	Gas produc- tion, helium plants	Helium produc- tion	Appre- ciation of for- eign cur- rency	Develop- ment and operation helium properties (special fund)	Print- ing and binding	Contin- gent	Total
Office of the Director	\$11, 100	\$64				\$874										\$12, 038
Office of the Assistant to the Director	9, 660	742				310										10, 712
Total	20, 760	806				1, 184										22, 750
Administrative																
Branch:																
Office Administra- tion Division	41, 740	25, 061	\$843	\$1, 000	\$2, 513	6, 134	\$6, 672	\$641			\$3, 546			\$1, 932	\$4, 987	95, 069
Information Divi- sion	2, 984	16, 472	13, 029	16, 642	13, 159	10, 142	9, 195	4, 662						5, 793		92, 078
Total	44, 724	41, 533	13, 872	17, 642	15, 672	16, 276	15, 867	5, 303			3, 546			7, 725	4, 987	187, 147
Chief Mining Engi- neer		2, 725														2, 725
Technologic Branch:																
Coal Division		95, 371	236, 175					82, 136						12, 255		425, 937
Explosives Divi- sion		90, 232				3, 064								1, 290		94, 586
Metallurgical Di- vision						175, 427								4, 132		302, 516
Mining Division		54, 784		122, 957		16, 471								4, 217		197, 811
Nonmetals Divi- sion				122, 339											42	146, 289
Petroleum and Natural Gas Division					236, 866				\$9, 961	\$4, 954	52, 939		\$5, 949	5, 062		315, 731
Principal Mineral Technologist				7, 520												7, 520
Total		240, 387	236, 175	252, 816	236, 866	341, 209		82, 136	9, 961	4, 954	52, 939		5, 949	26, 998		1, 490, 390

TABLE 2.—Bureau of Mines Expenditures, Fiscal Year 1938—Continued

Branch or division	General expenses	Operating rescue cars and stations and investigations of accidents	Testing fuel	Mineral mining investigations	Oil and gas investigations	Expenses mining experiment stations	Economics of mineral industries	Care, etc., buildings and grounds, Pittsburgh, Pa.	Acquirement of land, helium plant	Gas production, helium plants	Helium production	Appreciation of foreign currency	Development and operation of helium properties (special fund)	Printing and binding	Contingent	Total
Economics and Statistics Branch:																
Coal Economics Division							\$25,683							\$386		\$26,069
Mineral Production and Economics Division							88,169							26,514		114,683
Nonmetal Economics Division							50,324							1,111		51,435
Foreign Minerals Division							25,119					\$400		37		25,556
Metal Economics Division							37,594							463		38,057
Petroleum Economics Division							57,180							717		57,897
Total							284,069					400		20,228		313,697
Health and Safety Branch:																
Safety Division		\$280,126												13,652		302,778
Health Division		48,981												396		49,377
Total		338,107												14,048		352,155
Total appropriation	\$65,500	624,000	\$250,400	\$270,800	\$253,000	\$359,000	300,000	\$87,690	\$10,000	\$12,000	\$63,319	2,300	\$40,311	78,000	\$5,000	2,421,880
Total expenditures	65,454	623,558	250,047	270,453	252,538	358,609	299,956	87,439	9,961	4,954	56,485	400	5,949	77,998	4,937	2,368,863
Balances	16	442	353	402	462	331	64	251	39	7,046	7,334	1,900	34,362	2	13	53,017



PUEBLO WOMEN MAKING BOWLS. THEIR PRODUCTS ARE SOLD THROUGH THE INDIAN ARTS AND CRAFTS BOARD.

OFFICE OF INDIAN AFFAIRS

John Collier, Commissioner

IN ALL our colorful American life there is no group around which there so steadfastly persists an aura compounded of glamour, suspicion and romance, as the Indian. For generations, the Indian has been, and is today, the center of an amazing series of wonderings, fears, legends, hopes.

Yet those who have worked with Indians know that they are neither the cruel, warlike, irreligious savages imagined by some, nor are they the "fortunate children of nature's bounty" described by tourists who see them for an hour at some glowing ceremonial. We find the Indians, in all the basic forces and forms of life, human beings like ourselves. The majority of them are very poor people living under severely simple conditions. We know them to be deeply religious. We know them to be possessed of all the powers, intelligence, and genius within the range of human endowment. Just as we yearn to live out our own lives in our own ways, so, too, do the Indians, in their ways.

For nearly 300 years white Americans, in our zeal to carve out a nation made to order, have dealt with the Indians on the erroneous, yet tragic, assumption that the Indians were a dying race—to be liquidated. We took away their best lands; broke treaties, promises; tossed them the most nearly worthless scraps of a continent that had once been wholly theirs. But we did not liquidate their spirit. The vital spark which kept them alive was hardy. So hardy, indeed, that we now face an astounding, heartening fact.

THE INDIANS ARE NO LONGER A DYING RACE

Actually, the Indians, on the evidence of Federal census rolls of the past 8 years, are increasing at almost twice the rate of the population as a whole.

With this fact before us, our whole attitude toward the Indians has necessarily undergone a profound change. Dead is the centuries-old notion that the sooner we eliminated this doomed race, preferably humanely, the better. No longer can we, with even the most generous intentions, pour millions of dollars and vast reservoirs of energy, sympathy, and effort into any unproductive attempts at some single,

artificial permanent solution of the Indian problem. No longer can we naively talk of or think of the "Indian problem." Our task is to help Indians meet the myriad of complex, interrelated, mutually dependent situations which develop among them, according to the very best light we can get on those happenings—much as we deal with our own perplexities and opportunities.

We, therefore, define our Indian policy somewhat as follows: So productively to use the moneys appropriated by the Congress for Indians, as to enable them, on good, adequate lands of their own, to earn decent livelihoods and lead self-respecting, organized lives in harmony with their own aims and ideals, as an integral part of American life. Under such a policy, the ideal end result will be the ultimate disappearance of any need for Government aid or supervision. This will not happen tomorrow; perhaps not in our lifetime; but with the revitalization of Indian hope due to the actions and attitudes of this Government during the last few years, that aim is a probability, and a real one.

Such being the policy, expressed necessarily in general terms, let us see, concretely and specifically, how, and to what extent, this policy has been approached during the fiscal year ending June 30, 1938.

In looking at the Indian picture as a social whole, we will consider certain broad phases—land use and industrial enterprises, health and education, roads and rehabilitation, political organization—which touch Indian life everywhere, including the 30,000 natives of Alaska for whose health, education, and social and economic advancement the Indian Service is responsible.

Lastly, this report will tell wherein the Indian Service, or the Government's effort as a whole for the Indians, still falls short.

INDIAN LANDS

So intimately is all of Indian life tied up with the land and its utilization that to think of Indians is to think of land. The two are inseparable. Upon the land and its intelligent use depends the main future of the American Indian.

The Indian feels toward his land not a mere ownership sense but a devotion and veneration befitting what is not only a home but a refuge. At least 9 out of 10 Indians remain on or near the land. When times are good, a certain number drift away to town or city to work for wages. When times become bad, home to the reservation the Indian comes, and to the comparative security which he knows is waiting for him. The Indian still has much to learn in adjusting himself to the strains of competition amid an acquisitive society; but he long ago learned how to contend with the stresses of nature. Not only does the Indian's major source of livelihood derive from the land, but his social and political organizations are rooted in the soil.

A major aim, then, of the Indian Service is to help the Indians to keep and consolidate what lands they now have and to provide more and better lands upon which they may effectively carry on their lives. Just as important is the task of helping the Indian make such use of his land as will conserve the land, insure Indian self support, and safeguard or build up the Indian's social life. Many subsequent chapters of this report deal with this latter task.

In 1887, the General Allotment Act was passed, providing that after a certain trust period, fee simple title to parcels of land should be given to individual Indians. Individual proprietorship meant loss—a paradox in view of the Indian's love for the land, yet an inevitable result, when it is understood that the Indian by tradition was not concerned with possession, did not worry about titles or recordings, but regarded the land as a fisherman might regard the sea, as a gift of nature, to be loved and feared, to be fought and revered, and to be drawn on by all as an inexhaustible source of life and strength.

The Indian let the ownership of his allotted lands slip from him. The job of taking the Indian's lands away, begun by the white man through military expeditions and treaty commissions, was completed by cash purchase—always of course, of the best lands which the Indian had left. In 1887, the Indian had remaining 130,000,000 acres. In 1933, the Indian had left only 49,000,000 acres, much of it waste and desert.

Since 1933, the Indian Service has made a concerted effort—an effort which is as yet but a mere beginning—to help the Indian to build back his land holdings to a point where they will provide an adequate basis for a self-sustaining economy, a self-satisfying social organization.

By the close of the fiscal year 1938, the area of the lands held in trust for the Indians by the Government had been increased to approximately 51,540,307 acres—approximately 67 percent tribally owned, and 33 percent in allotments held in trust for the benefit of individuals.

A BEGINNING IS MADE

Under authority of the Indian Reorganization Act, Congress appropriated \$1,000,000 for the acquisition of land during the fiscal year 1936. For the fiscal year 1937, the sum of \$1,000,000 was again appropriated, and in addition the Secretary of the Interior was authorized to contract for an additional million dollars worth of land. The sum of \$950,000 was subsequently appropriated to meet these contractual obligations. During the fiscal year 1938, only \$500,000 was made available. As the result of these appropriations, there have been acquired for the Indians 169,769.83 acres, at a cost of \$2,207,-145.40. Of these totals, 64,354.85 acres were purchased during the last fiscal year, at a cost of \$1,216,725.14.

Also since the passage of the Indian Reorganization Act, 392,48 acres of former Indian lands which had been opened to sale or entry have been restored to tribal ownership and reservation status of the amount 38,279 acres were restored during the fiscal year ending June 30, 1938.

From 1935 through the fiscal year 1938, 30 purchase projects have been conducted by the Commissioner of Indian Affairs in cooperation with the Governmental agencies now merged in the Farm Security Administration. Options in the amount of \$3,521,057, covering 1,207,916 acres in 11 States, have been accepted, and purchases have been completed to the extent of 94 percent. By Executive order, on January 18 and April 15, 1938, the President transferred jurisdiction over approximately 791,405 acres of these lands from the Department of Agriculture to the Department of the Interior. Another Executive order is pending, transferring an additional 132,329 acres. Administrative jurisdiction over the remaining 285,222 acres will be retained by the Department of Agriculture, subject to further study concerning the proper utilization of the land.

CONSOLIDATION AND SPECIAL PURCHASE PROJECTS

Consolidation of Indian lands is an important corollary of land acquisition. Negotiations are under way in South Dakota to exchange scattered Indian tracts for State and county lands, so that the holdings of the Indians of the State and of the counties may be blocked into usable units. On the Cheyenne River Reservation, the exchange program involves approximately 133,000 acres of tribal allotted lands; on the Pine Ridge Reservation approximately 14,150 acres of tribal lands; and on the Standing Rock Reservation approximately 24,770 acres of tribal land. In working out these exchanges, the South Dakota authorities have been most cooperative.

In Florida, an exchange of 3,170.13 acres of scattered Seminole Reservation lands for other lands better suited to Indian purposes is nearing completion. The former State Seminole Reservation, comprising 99,000 acres in Monroe County, Fla., has been abolished by the State, and in its stead a new State reservation of 104,800 acres has been established in Broward County, adjoining Federal reservation lands in Hendry County.

The purchase of lands under the Arizona Navajo Boundary Extension Act of June 14, 1934 (48 Stat. 960), was continued with the purchase of 10,486.98 acres at a cost of \$17,159.45, bringing the total purchases under this act to 334,390.97 acres.

One hundred and twenty-nine acres of land were purchased for the Capitan Grande Indians of the Barona Ranch, Calif., at a cost of \$2,100.

Continued progress has been made in the purchase of land within the various pueblos in New Mexico with funds awarded pursuant to the Pueblo Lands Board Act, as amended. Purchases of 3,495.44 acres were completed involving an expenditure of \$57,534.36.

The act of May 31, 1938 (Public, No. 569, 75th Cong.), authorizes the Secretary of the Interior to withdraw and reserve permanently small tracts of not to exceed 640 acres each of the Alaskan public domain for schools, hospitals, and other purposes necessary to aid the Indians, Eskimos, and Aleuts of Alaska. This authority is proving of material assistance in the development of the Alaska program.

THE INDIANS DO THEIR PART

The Indians themselves are beginning to realize the folly of parting with their land holdings. Only four patents in fee were issued during the year to Indians, to relieve conditions of distress or because the land was needed for public or private projects.

A number of Indians have deeded their surplus or inherited lands or portions of them to the United States in trust for other Indians; usually for relatives who were landless or whose own lands were not suitable as home sites. Two Indians have deeded lands to the United States in trust for the tribe to which they belong. This, it is hoped, may be the beginning of a voluntary partial solution of the allotment situation.

A number of allotments have been exchanged between Indians in order better to consolidate their holdings or to acquire agricultural and grazing lands. Especially has this type of exchange been carried out on the Blackfeet Reservation in Montana, where many Indians have wished to acquire more and better farming lands, while others preferred to depend on larger grazing revenues.

Permits and leases for business purposes have increased somewhat since sales and patents in fee have been limited. On those reservations under the Indian Reorganization Act such permits and leases on tribal lands are now usually made by the tribal council.

COURT CASES AND TAX TROUBLES

During the fiscal year, 389.22 acres of land were restored to their original trust status through cancelation of five patents in fee issued to Indian allottees during the trust period without their application or consent. Cases involving approximately 75 allotments are pending in the Department of Justice, the majority of them cases in which it is sought to recover taxes illegally collected.

These cases do not include lands of the Five Civilized Tribes in Oklahoma, where suits have been instituted to remove clouds from the title and to recover possession of allotted or purchased lands for Indians.

As the result of the appropriation of \$25,000 made in pursuance of the provisions of the act of June 20, 1936 (49 Stat. 1542), needed relief has been given a number of Indians by the payment of past due taxes on properties purchased with trust funds and held under restricted deeds; the buyers having believed at the time of purchase that the property would be nontaxable.

A revision of the regulations to govern the sale of Indian lands, the issuance of patents in fee, and the purchase of lands with trust funds, including the Five Civilized Tribes in Oklahoma, was approved in the Department on May 31 of this year.

NAVAJO LEASES—NAVAJO BOUNDARY BILL

During the year an aggregate of 499,522.75 acres of white-owned land was leased for the benefit of Navajo Indians at an annual rental of \$16,273.96. The lands were leased pending acquisition, by purchase or exchange, of lands in Arizona under the provisions of the act of June 14, 1934 (48 Stat. 960), and the enactment of similar legislation applicable to New Mexico. The Arizona exchanges under the 1934 act are receiving attention at the present time, and it is hoped that they may be completed without much more delay. Legislation to extend the Navajo boundary in New Mexico will again be presented to Congress at its next session.

EXTENSION OF TRUST PERIOD

Trust periods were extended automatically by authority of the Indian Reorganization Act for all tribes which accepted that act. As a protection to those tribes which did not accept the act, the period of trust on lands which otherwise would have expired during the calendar year 1938 was extended by President Roosevelt on September 29, 1937, for a further period of 25 years.

EASTERN CHEROKEE CASES

On June 6, 1938, the contention of the United States on behalf of the Eastern Band of Cherokee Indians in North Carolina, regarding title to certain lands claimed for the Indians, was sustained by the United States Circuit Court of Appeals for the Fourth Circuit. Although the amount and value of land involved in the particular case was not large, the questions decided were important, since title to some 2,000 acres of land claimed for these Indians may depend on the determination of similar issues. A total of approximately 50 cases involving title to Cherokee Indian lands have been submitted to the Department of Justice, where they are under active consideration.

INDIAN TRIBAL CLAIMS

Final judgments in favor of the Klamath Tribe of Oregon and the Shoshone Tribe of the Wind River Reservation, Wyo., in the amount of \$5,313,347.32 and \$4,408,444.23 respectively, were rendered by the Court of Claims. Funds in satisfaction of these judgments were appropriated by the Second Deficiency Appropriation Act, fiscal year 1938, approved June 25, 1938 (Public No. 723, 75th Cong., 3d sess.).

The decisions in favor of these tribes in June, 1937, were appealed by counsel for the United States to the Supreme Court, where the decisions of the Court of Claims were affirmed.

In affirming the decisions of the Court of Claims in these two cases, the Supreme Court rendered decisions of great importance to the Indians. These two cases settled the question as to the scope of the title of an Indian tribe to the reservation set apart for it by treaty. In the Shoshone case, the Supreme Court held that the tribe's right of occupancy was as sacred and as securely safeguarded as in fee-simple absolute title, notwithstanding the fact that the United States retained the fee. Following this theory, it was held that the tribe's right of occupancy in perpetuity included ownership of the land, mineral deposits, and standing timber on the reservation, and an award was made accordingly. Interest on the sums found to be due at the time the reservation lands were taken was awarded both tribes as a part of just compensation for a taking of property by the United States in the exercise of its power of eminent domain.

Approximately 65 cases are now pending in the United States Court of Claims involving Indian tribal claims. Reports were made during the year to the Department of Justice and to the Court of Claims on seven cases. The court dismissed five cases with decisions adverse to the Indian tribes.

LEGISLATION

Reports were prepared and sent to the committees of Congress on some 300 bills relating to Indian affairs. Notable among the acts passed by the third session of the 75th Congress are the act of April 8, 1938 (Public, No. 474), amending the Menominee Jurisdictional Act of September 3, 1935 (49 Stat. L. 1085), to permit the filing of separate suits in the Court of Claims; the act of June 15, 1938 (Public, No. 632), to divide the funds of the Chippewa Indians of Minnesota between the Red Lake Band and the organized Minnesota Chippewa Tribe; the act of June 28, 1938 (Public, No. 754), conferring jurisdiction upon the Court of Claims to hear, adjudicate, and render judgment on the claims of the Ute Indians against the United States; and the act of June 28, 1938 (Public, No. 755), authorizing the Red Lake Band of Chippewa Indians to file suit in the Court of Claims.

IMPROVEMENT OF LAND RECORDS

During more than a century, approximately 15,000 maps, graphs, tracings, and similar records relating to Indian lands have accumulated in the Indian Office. The methods used for filing these records have not been adequate for their proper preservation. In April, 1938, a project was inaugurated for the repair, preservation, recording, indexing, and filing of these maps. The work of repairing and preserving the maps is being done under the direct supervision of the Division of Repair and Preservation of The National Archives.

It has not been possible heretofore to index adequately the records of deeds and similar documents relating to the status of Indian lands. As part of a Works Progress Administration project a comprehensive index of approximately 25,000 deeds is being prepared. Other records of the Records Section are also being carefully indexed.

PROBATE WORK

Due to legislation affecting Indians, the adoption of constitutions, bylaws, law and order regulations, and the establishment of tribal courts, the probate work of the Indian Office has grown greatly and its problems have multiplied.

The past year saw a considerable increase in probate output both in number of estates and value. Even so, a large number of estates still await action.

Indian Probate Work

Probate cases handled outside the Five Tribes and Osage Nation, 1937-38.....	1, 793
Wills considered for form and approved.....	431
Wills considered for form and rejected.....	85
Appraised value of estates probated.....	\$3, 357, 314. 80
Fees charged against estates.....	\$46, 675. 00
Average value of estates.....	\$1, 872. 45
Average fee for probate.....	\$26. 03

A conflict in the regulations covering allowance of claims against living Indians, and the allowance of creditors' claims against their estates, after they are dead, is now being studied with the purpose of making these regulations uniform. This situation has, in the past, caused considerable confusion, as it has been the practice to allow claims against an estate that have been denied against the living Indian.

Probate Work—Five Civilized Tribes

Total number of cases submitted.....	423
No intervention.....	250
Probate attorney appeared.....	83
Transferred to Department of Justice for intervention.....	37
Tax and attorney fees.....	53
Number of cases pending:	
Civil.....	171
Probate.....	2, 231
Number of court appearances.....	1, 698
Number of deed and lease approvals.....	354
Amount involved in court appearances.....	\$3, 829, 670. 97
Amount saved Indians.....	\$255, 289. 55

The work of the Five Civilized Tribes, passing through the Indian Office, is separately reported to the Department by the supervising probate attorney.

Work has continued in connection with Federal estate taxes in the Five Civilized Tribes. Practically all such cases have been concluded so far as adjustment with the Treasury Department is concerned, and court proceedings are now contemplated and in preparation on such matters as were impossible of settlement.

From Osage, Okla., 102 cases have been handled. Many of these are will contests involving large amounts of money. Some have required months of study, conferences with attorneys and other bureaus of the Department, and extensive correspondence.

CONSERVATION OF INDIAN RANGE AND FOREST LANDS

Of the lands remaining to the Indians, some 46,000,000 acres are in forest and range. As guide and supervisor in the field of forest and range management, the Indian Office, has, therefore, responsibility over a territory larger than the entire State of North Dakota.

The income from timber sales and the money value of timber used on the reservations, the income from grazing leases and permits, and the money value of free grass consumed by Indian livestock, constitute together one of the Indians' major sources of revenue.

Indian Forest Resources

Area:		
Timberland.....	acres..	6, 000, 000
Woodland.....	do.....	8, 000, 000
Total forest area.....	do.....	14, 000, 000
Timber:		
Volume.....	ft. b. m..	33, 000, 000, 000
Value.....		\$90, 000, 000
Timber production and sales, 1938:		
Total volume cut.....	ft. b. m..	426, 210, 000
Gross income from timber.....		\$1, 175, 620

Conservation, for the benefit not only of the Indian, but of the whole Nation, is, of course, the controlling policy in the administration of Indian grazing and forest lands. In no other field, through no other Federal bureau, does the Government enjoy such an opportunity to prove what can be accomplished in the way of conservation and proper land use as it does in the supervision by the Indian Service of the Indian domain. The Indian Service, through its position as guardian over Indian lands, can apply a concentrated technical knowledge and action directly to the problem.

Inevitably, of course, certain of the rules and regulations requisite to proper conservation and land use run counter to individual Indian interests. The Indian owner of a well-watered allotment may resent the order of the agency superintendent which prohibits him from leasing his land for the higher rental paid for agricultural land and requires him to reserve it as the key tract of a range unit and to take the lower payment per acre for grazing lands. Indian livestock owners fortunate enough to possess more than an average number of cattle and sheep are sometimes annoyed when told that, for the sake of their neighbors and for the preservation of the range, they must curtail their holdings. But the Indian country over, such instances of complaint and objection are comparatively few. The Indian tradition of common action for the common good is reborn, once the problem and the goal are understood. The Indian probably surpasses his white brother when it comes to accepting individual restraints in order that the community may prosper.

RANGE MANAGEMENT

The objectives sought in the management of Indian range resources, as stated in the General Grazing Regulations, may be concisely put as follows:

1. The preservation through proper grazing practice of the forest, the forage, the land, and the water resources on Indian reservations, and the building up of these resources where they have deteriorated.
2. The utilization of these resources for the purpose of giving the Indians an opportunity to earn a living through the grazing of their own livestock.
3. The granting of grazing privileges on surplus range lands not needed by the Indians in a manner which will yield the highest return consistent with undiminished future use.
4. The protection of the interests of the Indians from the encroachment of unduly aggressive and antisocial individuals.

Indian Range Lands

Total acreage-----	acres--	40, 000, 000
Great Plains: North and South Dakota, Montana, Wyoming-----	acres--	13, 000, 000
Intermountain: Idaho, eastern Washington, and Oregon do----		4, 000, 000

Indian Range Lands—Continued

Southwest: Utah, Colorado, Arizona, Nevada, New Mexico-----	acres--	\$23, 000, 000
Open range-----	do-----	32, 000, 000
Woodland, grazed-----	do-----	8, 000, 000

Grazing Income and Livestock, Fiscal Year 1938

Income of Indians from grazing:		
Total income from grazing-----		\$1, 420, 767
From lands grazed under paid permits or leases-----		693, 197
Cash value of free grazing by Indians-----		727, 570
Average income per acre-----	cents--	3½

Number of Livestock Grazed on Indian Land

	Under permit or lease	Free, by Indians	Total
Cattle-----	152, 873	158, 274	311, 147
Sheep-----	603, 860	680, 126	1, 283, 986
Horses-----	2, 562	98, 084	100, 646

During the fiscal year ended June 30, 1938, the Indians enjoyed a gross income from their range lands of more than \$1,400,000; somewhat less than one-half of this amount coming in in cash payments paid by Indians and non-Indians for grazing privileges, and something more than one-half being made up by the money value of the grazing privileges enjoyed free of charge by Indian livestock operators.

TIMBER FOR TODAY—AND TOMORROW

In the management of the Indians' forest resources, as in the management of the range lands, conservation is the watchword. Wherever practicable, the cutting of timber is conducted strictly according to sustained yield practices. That is, the depletion of the timber supply is geared down to the rate of reproduction so that the Indians may enjoy their forest resources in perpetuity. In certain cases, unfortunately, sustained yield practices cannot be followed. Overripe timber or trees damaged by fire or insects must be cut. The demands of Indians owning timbered allotments cannot always be rejected, and the timber must be turned into the cash which the owners insist upon having. The goal, however, remains a sustained yield policy extended over all Indian forest lands.

Of an estimated 33,000,000,000 feet of timber on Indian lands, approximately 426,000,000 feet were cut during the fiscal year 1938, bringing to the Indians a gross income of approximately \$1,175,000. During the year, new contracts were completed covering the sale and future cutting of 270,290,000 feet of timber on seven units located on four reservations.

During the fiscal year, range investigations and timber surveys initiated during 1937 were continued and completed. The policy of selective logging on Indian lands was standardized and strengthened through the formulation of standard marking regulations which promise a more effective balancing of age classes. In cooperation with the Civilian Conservation Corps—Indian Division, pine beetle control work has been continued on the Klamath, Warm Springs, and Yakima Reservations. Favorable weather conditions made this work particularly effective, especially on the latter two reservations. A serious pine beetle epidemic still exists at Klamath. The current timber sale policy, however, is resulting in the salvaging of a substantial volume of mature timber annually, and the elimination of trees susceptible to beetle attack.

SAWMILL OPERATIONS

Fourteen Indian sawmills were operated during the year. These sawmills gave employment and training to a large number of Indians. Much of the lumber produced was used in building homes and other improvements. The two largest units, the Menominee Indians Mills in Wisconsin and the Red Lake Indian Mills in Minnesota, are operated on a commercial basis for the benefit of the Indians, under specific authority from Congress. During the year, the Menominee Indian Mills manufactured 18,001,076 feet of lumber and shipped 14,898,571 feet. In addition, a large quantity of byproducts was sold. Over 6,000,000 feet of hemlock which had been killed by the hemlock borer was also salvaged and sold to pulp and paper companies. The lumber manufactured at the Red Lake Indian Mills during the year amounted to 7,151,490 feet and 4,136,013 feet was sold and delivered.

On May 6, 1938, the Interstate Commerce Commission, after hearings, authorized the abandonment of the Minneapolis, Red Lake and Manitoba Railroad. The loss of this railroad will seriously handicap the operations of the Red Lake Indian sawmill and the Red Lake Indian fisheries.

FIGHTING FOREST FIRES

Forest-fire control on Indian lands was effectively reorganized during the fiscal year under revised regulations embodied in the Hand Book of Fire Control for the Indian Service, which was approved May 22, 1937. The organization of fire-control work by regions and the delegation of increased authority to the regional foresters not only provides closer supervision over the fire-control organizations on the various reservations but furnishes the reservation personnel with technical assistance and direction during periods of high fire hazard. The efficiency of fire-control work has been materially increased through projects undertaken by the Civilian Conservation Corps—Indian Division. Many truck trails, lookout towers, and telephone

lines have been constructed. The communication system has been greatly strengthened through the intensive use of semiportable and portable short-wave radio sets.

Forest Fire Record, 1938

Number of forest fires.....	1, 085
Area burned over.....acres..	10, 950
Amount of damage.....	\$19, 659
Cost of suppression.....	\$47, 137
Average burn.....acres..	10
Damage per fire.....	\$18. 19
Cost of suppression per fire.....	\$43. 44

A QUESTION CONCERNING ADMINISTRATIVE COST

An analysis of the business aspect of forest and range management on Indian reservations shows an administrative cost that is extraordinarily low. The question is, however, raised as to whether this low administrative cost, which necessarily means a smaller, less effective administrative organization, is truly economical. The ratio of 1938's administrative cost of \$412,000 to 1938's gross revenues of \$2,596,387 from forestry and grazing is only 15.8 percent, and the administrative cost spread over the 46,000,000 acres under management reflects a cost per acre of less than nine-tenths of a cent. Such conservative administrative cost becomes overconservative when the question is regarded from the standpoint of the \$100,000,000 in property values involved and the danger of sustaining serious losses by reason of the failure to provide sufficient funds for adequate supervision and protection.

Judged by standards obtaining in other services of a similar nature, appropriations averaging less than nine-tenths of a cent per acre for all administrative purposes, including protection, are inadequate, and the ratio of cost to income of less than 16 percent is unreasonably low. For example, the Canadian Government for the administration of Crown forests authorizes the expenditure of 25 percent of the gross income. The act of August 28, 1937 (50 Stat. 874), provides 25 percent of the gross income for the administration of the "Revested Oregon & California Railroad and Reconveyed Coos Bay Wagon Road Grant Lands of the State of Oregon." The conservation of Indian forest and range resources justifies the expenditure of a larger amount of money than has heretofore been provided.

IRRIGATION'S PART IN INDIAN LIFE

With most of the Indian reservations in the arid or semi-arid region, irrigation is vital to Indian life. Certain southwest tribes have been appropriators of water from times of remote antiquity and were working extensive irrigated farms when found by the Spaniards during the middle of the sixteenth century. The Indian Service not only

greatly extended and improved these old irrigation systems, but has built new projects on practically every reservation throughout the western arid territory. These irrigated areas range from small subsistence gardens of a few acres to highly developed reclamation projects of 100,000 acres or more. Not all of the larger projects are confined to Indian-owned lands. Privately-owned areas contiguous to the reservations have been included in order to round out the projects.

The earliest irrigation construction work for the Indians was done by the Reclamation Service in 1902, and taken over by the Indian Service in 1909.

RECENT DROUGHT EXPANDS IRRIGATION ACTIVITIES

The severe and widespread drought of the past 5 or 6 years has not only accentuated the need of larger irrigation facilities in arid Western States, but also has created many demands for irrigation works in the Great Plains area, including principally the Dakotas, eastern Montana, and Minnesota. As a consequence of this demand, Indian Service irrigation activities have been extended to these areas and a number of subsistence gardens have been constructed and other water supply developments, principally for stock and domestic use, have been completed. The orderly expansion of Indian irrigation is essential to afford means and opportunities for self-support, as well as to preserve Indian water rights, which are increasingly being jeopardized as development of the country takes place.

SUBSISTENCE GARDENS PROVE SUCCESS

The community subsistence garden program which was started in 1935 with funds provided by the Public Works Administration and continued during subsequent years with funds regularly appropriated has proved highly successful. Further construction of these gardens during the past year has increased the number to 98. The C. C. C.—Indian Division has participated in practically all subsistence garden construction work. Crop returns from these developments during the calendar year of 1937 amounted to \$61,600. This represents a gross return of 32 percent on a total construction investment of \$191,284. More than 1,600 Indian families and three large Indian schools derive a large part of their subsistence requirements from these gardens.

IRRIGATED ACREAGE INCREASES

Indian irrigation reports show that there are approximately 1,200,000 acres of irrigable land within the present Indian irrigation projects, of which area 800,000 acres are under constructed works, and full irrigation facilities have been provided for approximately 550,000 acres. The area irrigated by Indians shows an increase of 17,000

acres over the previous year and an increase of 1,600 families devoting attention to farming operations. A tabulation showing comparative statistics on Indian Service irrigation projects for the past 4 calendar years follows:

Year	Acreage irrigated			
	By Indians	Indian land leased	White owned land	Total
1934.....	140,788	108,435	198,088	447,311
1935.....	147,264	117,178	197,995	462,437
1936.....	150,940	130,353	206,702	487,995
1937.....	168,360	134,689	220,126	523,175

Construction costs to date have amounted to approximately \$54,000,000 with an estimated additional amount to complete all projects of \$46,000,000. These amounts, with an estimated further sum of \$5,000,000 with which to assist in the subjugation of Indian lands, make a total average cost of less than \$100 per acre.

CONSTRUCTION PROGRAM

The construction and water development program was maintained at approximately the same level as during recent years. Work of considerable magnitude was done on 6 of the larger projects and continued construction of smaller works was carried on on 14 reservations. Additional subsistence gardens were constructed in Oklahoma, New Mexico, Arizona, Nevada, California, and North, and South Dakota. Water supply development for both stock and domestic use was continued in the Navajo, Hopi, Pueblo, and Papago areas in New Mexico and Arizona.

Appropriated and other funds available for construction, operation, and maintenance during the fiscal year amounted to \$4,121,995. Of this sum \$1,579,498 was appropriated for regular maintenance and operation and an amount of \$185,000 was left over from Public Works allotments. All construction appropriations were made reimbursable by the land benefited, although under the Leavitt Act of July 1, 1932 (47 Stat., 564), these charges are not collectible so long as the lands remain in Indian ownership. Annual operation and maintenance charges are collected from all white users and from all Indians financially able to make payments.

MAJOR PROJECTS

Of the major projects now being undertaken, that on the Colorado River Reservation in Arizona is the largest. This work contemplates the construction of an irrigation system to supply water from the Colorado River to 110,000 acres. Irrigation works will include a large

diversion dam[¶] across the river, together with appurtenances and a complete canal system. Plans and specifications were completed during the year and a contract for construction was awarded on June 28. Work on the other large projects consisted of the completion of the storage dam on the Owyhee River, Western Shoshone Reservation, Nev.; the completion of a storage reservoir and the commencement of a large pumping plant on the Flathead project, Montana; continuation of work on the Fort Peck, Mont., pumping plant; and preliminary work on the construction of a large storage dam on the Crow Reservation, Mont. Miscellaneous, but extensive, construction activities were continued on the Navajo and Pueblo Reservations in Arizona and New Mexico.

PARTICIPATION IN CONSTRUCTION COSTS WITH OTHER AGENCIES

With the purpose of obtaining additional water supplies for several Indian projects, the Indian Service is sharing in the cost of construction of four large storage dams. Three of these are being constructed by the Reclamation Service and will supply additional water as in the case of the Southern Ute Reservation in Utah, under the Pine River Dam; the Salt River Reservation under the Bartlett Dam in Arizona, and the Fort Belknap Reservation in Montana, under the Milk River Dam. A contract is being negotiated with the Montana State Water Conservation Board and the Tongue River Water Users Association to participate in the construction cost and receive storage right benefits from a storage dam now being constructed on the Tongue River in Montana. This will supply additional water for the Tongue River Reservation.

ECONOMIC SURVEY AND MISCELLANEOUS INVESTIGATIONS

An economic survey to investigate and adjust irrigation charges pursuant to an act of Congress has been in progress during the fiscal year. This investigation will cover all features affecting the economic status of irrigation projects so that definite recommendations can be made to Congress. The field work on this activity has been confined during the year to the Uintah Reservation in Utah and to the Fort Hall Agency in Idaho. Surveys and investigations have also been made looking to the protection of water rights on a number of reservations and projects including especially New Mexico Pueblos and Indian-owned land in Oklahoma. Investigations and studies were made on prospective irrigation projects and developments in Montana, Oklahoma and the Dakotas. A number of these investigations are being made in cooperation with other agencies both Federal and State.

MAKING A LIVING

When a white extension worker deals with white rural groups he can often get cooperation for a good program within 2 or 3 weeks. He is speaking to people who have his own ambitions and whose fundamental reactions to life, often, are his own. When he tries to make effective an equal plan for Indian people, it is another story.

Nearly 300 years of deeply rooted distrust, and an attitude toward life which does not regard the piling up of material means as a first consideration, or of bulwarks against the future as of major significance, make the extension worker's Indian task much more complicated. What he can do with a white group in 2 weeks may, for these reasons, take him a year, or even more, with an Indian group.

John Eagle Eyes, as he listens to an Indian Service worker talk of the profits of a certain type of agriculture or grazing, does not easily forget that his own grandfather gave 20 years of his life toward building up a farm only to be driven from that land by an Executive order. Centuries of a hunting life are in John Eagle Eyes' blood and being, influencing him always. His whole countryside and all its hunting and fishing once belonged to him and his people. These are now gone. A succession of new ways of living which were laid out for him never equalled what he once had, in his opinion; for him no incentives that he considered essential urged him to adopt our ways.

An increasingly important part of the Indian Service task, thus, is to work out with the Indian (who is predominantly rural and non-industrialized) his own plans, and to help him clearly see what he is really going after. What does he want in terms of his own Indian life? What are the best methods, for him, of effectively adapting himself to white man's civilization?

In 1938 this Office has 311 men and women trained and experienced in essential rural activities living in every corner of the Indian country. Their lives are devoted to helping the Indians help themselves, by example, leadership, and actual shoulder-to-shoulder working with them. These workers have various official capacities, but they do not limit themselves to the formal label of their jobs. They "pitch into" every phase of Indian life and make themselves useful in everything, literally, which helps the Indian more effectively to make his living.

It is worth mentioning, in passing, that Indian Service workers generally, whether they be administrators, teachers, doctors, or technical experts, have always found it necessary to step frequently outside their own specialties to lend a hand to some urgent human problem needing the aid of the nearest capable person.

Within the last few years, a whole new world of credit and finance has been opened to Indian people. Reimbursable loans are made possible to all Indians living under the Indian Reorganization Act. The decision as to whether an individual Indian or a group will be given

a chance to borrow money rests with the workers in the field. These loans must be discussed carefully with each individual or group, for the loan goes far beyond a mere financial transaction.

Our experience shows repeatedly that the social and economic pattern of Indian lives often depends upon the intelligent use of borrowed money and the obligation upon the Indian to repay it. With the use of credit now a reality to an increasing number of Indians, cooperative leadership on our part is increasingly superseding the old-time dominations and those who urgently tried to sell a white man's idea for a nonwhite environment. Cooperative work in the Indian Service is essential now, toward effective help for the Indian in terms that mean something to him.

When we translate these various social forces into measurable reality, the following facts of last fiscal year's activity show some concrete and hopeful results. This is particularly true if the objective data here given is viewed in terms of what has just been said.

Livestock			
Cattle:	1936	1937	
Number of Indians owning cattle.....	21, 635	21, 287	
Number of head of live animals sold.....	48, 133	69, 388	
Pounds of dressed meat sold.....	616, 088	704, 639	
Total income from cattle.....	\$1, 251, 371	\$2, 190, 620	
Sheep and goats:			
Number of sheep units.....	942, 177	960, 725	
Receipts from wool and mohair.....	\$614, 516	\$792, 556	
Total income from sheep and goats.....	\$1, 142, 118	\$1, 519, 251	
Other livestock:			
Number of horses, mules, burros sold.....		5, 311	
Number of Indians owning horses, mules, and burros.....		28, 610	
Number of horses, mules, burros owned.....		134, 905	
Poultry:			
Number of birds owned by Indians.....		362, 732	
Number of Indians owning poultry.....		15, 176	
Cooperative livestock associations:			
Number of associations.....	119	124	
Total membership.....	4, 476	5, 047	
Number of cattle owned.....	123, 061	127, 275	

INDIANS GRADUALLY RETURNING TO FARM ECONOMY

It has been encouraging to see a slow steady increase of Indians returning to their farms. The following facts show the trend:

	1936	1937
Number of acres cultivated.....	514, 529	544, 893
Acreage planted to cereal crops.....	244, 135	245, 330
Yields in bushels from cereal crops.....	2, 091, 360	3, 681, 731
Yields in tons from forage crops.....	198, 074	278, 841
Acreage planted in cotton.....	16, 682	17, 508
Yield in bales from cotton crops.....	3, 470	6, 026
Acreage planted in sugar beets.....	191	265
Yield in tons from sugar beets.....	2, 077	4, 077

INDIAN BOYS AND GIRLS AT WORK

The following table gives the facts relative to 4-H Club work:

	1936	1937
Total project enrollment.....	5, 758	6, 853
Total projects completed.....	4, 222	4, 936
Number of different members enrolled.....	3, 881	5, 156
Number of different members completing projects.....	2, 740	3, 512
Percentage of completions.....	73. 3	72. 17
Number of clubs.....	328	387

MODERN PRACTICES IN INDIAN HOMES

A growing number of the most intelligent women workers we can find are going into the Indian homes and working with Indian women. These workers are invariably trained in home economics and, much more important, they are trained in those things essential to happy, well conducted homes. If it is not easy for the average white wife, who is probably a high school graduate and who has lived in the very midst of white civilization, to run a home efficiently without some training, it is certainly no easier for Indian women.

During the year 1937 there was a total of 10,871 meetings held by Indian Service home economics workers with Indian women, on canning, drying, clothing, home improvement, nutrition, child care and recreation. Objective progress over the previous year is shown in the following figures:

	1936	1937
Number of quarts of fruits, vegetables, and meats canned.....	765, 051	1, 898, 579
Number of pieces of clothing made under auspices of home extension groups.....	142, 710	182, 415

SUMMARY

Helping the Indian help himself, therefore, has become the aim of all Indian Service work. It is pleasant to talk of spiritual development, moral awakening, and educational growth, but unless the Indian has enough to eat and enough to take care of the normal, decent clothing and shelter needs of himself and his family, he has little heart or spirit, or even strength, to give to other things. There is no more significant and essential task confronting the Indian Service than helping the Indian get on his own feet. After this, other things follow as they already are following.

**CONSERVATION WORK REBUILDS INDIAN LANDS;
GIVES WORK RELIEF**

Conservation work on Indian lands, as carried out by the Civilian Conservation Corps—Indian Division, is entering its fifth year. C. C. C.—I. D. work, during the recent years of drought and depression, has been almost the backbone of life itself. More than a source

of relief, however, the program has brought far-reaching improvements to Indian forests, ranges, and farm lands. The cumulative effect has meant better distribution of stock on Indian ranges; the opening up, through urgently needed water development, of additional range; better forage through fencing and reseeding; fire protection truck trails, fire breaks, fire towers, and telephones; checking of erosion through check-dams; and the elimination of pests.

Since able-bodied Indians, irrespective of age, can be employed, the work has been widely spread. The average daily number of of employed enrollees during the year was 6,907. Employment had to be rotated at some agencies, so that approximately 9,500 participated in the program during the year. Although curtailment of the program meant a reduced personnel overhead, Indian preference in supervising and facilitating positions continued wherever possible. Four hundred and thirty-eight Indians held such positions during the year as against 344 whites.

TRAINING PROGRAM FOR ENROLLEES

During the past year, the C. C. C.-I. D. has emphasized instruction and welfare for its enrollees. The programs, which are carefully integrated with other Indian Service work, have varied according to local needs. Supervising employees have given generous voluntary support and time to the instruction program, which includes physical training and sports, individual counsel, placement work, training in personal health and hygiene, and training in various vocational and cultural subjects.

SAFETY PROGRAMS CUT ACCIDENT RATE

Our C. C. C.-I. D. death-from-injuries rate was cut almost in half during the past year—from 11 in 1937 to 6 in 1938. This may be laid, in part, at least, to the safety program, which has included weekly meetings, frequent inspection of projects, men, and equipment, and the sustained emphasis upon first-aid and aquatic safety instruction. Proper handling of automotive equipment, hand-tools, and explosives, has been insisted upon. All supervisory and facilitating personnel, as well as leaders, assistant leaders, truck drivers, and machine operators, are required to work for Red Cross standard first-aid certificates. Over half already hold these certificates and the others are working toward them. Some 25 percent of the enrollees have also passed the Red Cross examinations for certificates.

1938 Production Accomplishments
Civilian Conservation Corps—Indian Division

Telephone lines.....	miles..	668
Fire breaks.....	do..	95
Truck trails.....	do..	733
Horse trails.....	do..	237
Fences.....	do..	860
Springs, small reservoirs, and well development.....	units..	552
Impounding and large diversion dams.....	do..	142
Insect and tree pest control.....	acres..	66, 661
Erosion control check dams:		
Permanent.....	units..	3, 003
Temporary.....	do..	397
Vehicle bridges.....	do..	56

INDIAN INCOME

Popular ideas concerning the economic condition of the Indians vary widely. Those who have come into contact with the few Oklahoma Indians who struck it rich in oil, fancy the Indian as an opulent nabob. Those who have seen some of the homeless Crees and Chippewas picking over the refuse in the alleys of some Minnesota town picture the Indian as a starving waif. As usual, the truth lies somewhere in between; though much nearer the lower extreme than the upper.

The average Indian family lives above, but not far above, the minimum of subsistence. Cases of wealth are few; instances of critical poverty are many.

During the past year an effort was made to obtain more reliable and comprehensive information concerning Indian economic life. Estimates of the aggregate income of Indians living on reservations for the calendar year 1937 were requested from agency superintendents. From a preliminary tabulation of the data contained in these income statements which were received from 52 agencies, representing 131 reservations and approximately 162,000 Indians, a sample was obtained sufficiently large and geographically so distributed as to give a fair cross-section of Indian income and wealth.

The average Indian family of four persons enjoyed an estimated income for the year 1937 of approximately \$600. This figure comprises earned income and unearned income. It includes nonmoney income, as well as money income.

Thus, the average Indian family belongs very definitely in the lower third of the American population, as divided by size of income. Of the 131 groups reported on, only 15 (some very small) showed estimated incomes of more than \$1,000 per family; only 4 were in that estimated tenth of the population receiving family incomes of \$2,500 or more; and only in 3 groups, the Five Civilized Tribes, Osages and Quapaws, was there a considerable number of families in that magic 2 percent of the citizenry receiving family incomes of \$5,000 or more a year.

Of the total income received by Indians, approximately two-thirds was individually earned by the Indians themselves. Relief, both work relief and direct relief, made up a dismayingly large percentage of the income of many groups.

A valuable test of Indian economic progress lies in the year-by-year measurement of income, particularly the income earned by Indians through their own efforts at self-support. The Indian Office plans, therefore, to continue collecting and interpreting income data and to expand the scope of its statistical inquiries into Indian economic life.

INDIAN REHABILITATION

Thanks to the continued provision of emergency funds, the Indian Service was able to go forward with its attack on one of the major problems of Indian welfare—the lack of housing which meets even minimum standards of health and comfort, and the lack, general throughout the Indian country, of physical facilities for the conduct of community enterprises.

Housing, or the lack of it, carries, among the Indian population, an economic as well as social implication. Without a decent dwelling, without essential auxiliary farm buildings, the Indian family cannot live on and use its one principal resource—the land. The result, an inevitable drift to the vicinity of the agency with its work relief, rations, and fuel; the gradual springing up, near the agency, of a pauper's village of tents and shacks.

Help was extended the Indians, early in 1936, by an allocation of Emergency Relief funds for the initiation of a program of Indian rehabilitation.

Concentrating on the construction and repair of houses, farm buildings, and community buildings, and the financing of self-help enterprises, this program has had a triple aim: To provide some of the neediest Indians with houses and necessary farm and community buildings; to restore the Indians to the land and to a self-sustaining level; and, with the achievement of these first goals, to relieve the Federal Government, by that much, of the burden of caring for helplessly destitute, hopelessly dependent Indian wards.

Early in the fiscal year of 1938, the sum of \$1,055,000 was made available to the Office of Indian Affairs for the continuation of this rehabilitation program. The new allocation was made from funds provided by the Emergency Relief Appropriation Act of 1937, by means of transfer from the Farm Security Administration.

In the operation of the rehabilitation program, Indians have shown themselves eager to use every chance for self-improvement. They have seen in this work an opportunity, through their own efforts, to make fuller use of their resources. For example:



PROGRESS IN INDIAN HOUSING. BEFORE AND AFTER AT YAKIMA, WASH.

A REVITALIZED INDIAN COMMUNITY

In 1936, when rehabilitation funds were made available to the Office of Indian Affairs, it was determined to establish a small community on the Rosebud Reservation in South Dakota for the purpose of providing homes and an opportunity for self-support for a limited number of young Indian families with children, for whom no land was otherwise available. The families selected had been living with their parents under crowded conditions in inadequate homes, and there seemed to be no other opportunity for them to establish themselves as separate family units.

The Grass Mountain community is situated on the Little White River. Some 600 acres of fertile land located on the river were available. Fourteen acres were devoted to irrigated gardening. A stand of timber furnishes the community with fuel. There are also from 250 to 350 acres of range land which, added to adjacent grazing land which may be rented, will permit the community to develop a livestock herd.

From its start in the early part of 1937, into and through the past year, the Grass Mountain community has made progress. The community has utilized the opportunities provided under the Reorganization Act by organizing under the name of the Grass Mountain Development Association; and has borrowed from the Revolving Credit Fund the sum of \$3,500. With this money it has purchased three teams of mares, wagons, hay-making machinery, chickens, and milk cows, and will later lease additional grazing land.

Under the rehabilitation program facilities were installed for 12 families, consisting of a house, poultry house, and toilet for each family; three community wells were drilled; a canning kitchen and root cellar were constructed. During the first year in which the community was in operation, foodstuffs produced in the irrigated gardens and preserved in the canning kitchen totaled 6,050 cans of various vegetables.

Delegations of Indians from various parts of the Rosebud Agency and from other agencies in adjoining States have visited the new community. So impressed have they been with the success of this group and the improvement in their morale and physical well-being that a number of them have applied for an opportunity to develop similar communities.

Indians at several jurisdictions, due to improvements installed under the rehabilitation program, have announced that they are now in a position to provide food supplies, and in some cases clothing, for their own aged and indigent members. At other agency jurisdictions, because of rehabilitation work done, the superintendents have advised the Washington office that no further rehabilitation work is required.

Rehabilitation work during 1938 was conducted at 28 agencies situated in 18 States. The projects undertaken with the funds allocated during the past fiscal year were reduced in number in an attempt to concentrate this necessary work at fewer agencies, in order that more substantial results might be accomplished. During this year, employment reports showed as many as 1,986 needy Indians at one time being given work in carrying out the program.

Rehabilitation Projects in Progress, 1938

Individual units:		Community improvements—	
Houses, new	359	Continued	
repaired	965	Root cellars	1
Water development	469	Shop buildings	4
Toilets	573	Implement sheds	6
Barns, new	78	Grist mill	1
repaired	106	Flour mill	1
Poultry houses	139	Self-help laundries	2
Hog houses	30	Combination slaughter and	
Cattle sheds	50	smoke house	1
Root cellars	140	Livestock pens and exhibit	
Gardens	265	hall	1
Fencing units	60	Stock watering units	2
Kitchen ranges	28	Dipping vats (6 new; 10 re-	
Community improvements:		paired)	16
Self-help project buildings,		Buck herds purchased	3
new	30	Canning and sewing projects	100
repaired	14	Arts and crafts projects	3
Equipment for self-help build-		Sawmills	4
ings, new	8	Storehouses and tanneries	2
repaired	21	Land improvement	30
Outbuildings (3 barns; 1		Gardens and hot beds	25
poultry)	4	Agricultural equipment	17

ROADS FOR INDIAN NEEDS

Living upon reservations and, generally, in remote, sparsely populated sections, Indians have no need for the class A super-highways of our crowded cities. Indian Service roads thus are deliberately built to give the greatest number of usable miles per dollar while observing technical standards of safety, and economy in construction, and future maintenance.

For the last fiscal year the Congress appropriated \$3,000,000 for Indian roads. The money was used as follows:

Roads:			
Improved	-----miles--	620.	25
Surfaced	-----do-----	476.	87
Maintained and repaired	-----do-----	5, 811.	43
Bridges:			
Constructed	-----	94	
Repaired	-----	357	

Culverts:

Constructed and installed.....	1, 740
Maintained and repaired.....	1, 071
Total number of people employed on road work during year.....	7, 954
Total man-hours of work furnished during the year.....	3, 064, 977
Average earnings per hour.....	\$0. 46

Two factors are especially important in considering the Indian Service road program. One is that roads must specifically further the economic and social development of the reservation life and culture; Indians must be able to move reasonably freely from their homes to the day schools, hospital and health centers, marketing, and agency communities. Secondly, Indian roads must give a maximum amount of work to employable Indian people.

Since the Indian is not exempt from the payment of gasoline tax, which is the source of revenue of most of our roads, he is entitled to have his road needs fully considered and acted upon.

Superintendents of Indian reservations have conservatively estimated that during the next 5 years, 6,872 miles of construction and improvements are needed to help the Indian reasonably effectively utilize and develop his land and resources. If this program were realized it would call for an expenditure of approximately \$7,000,000 annually. Increasing amounts of the road appropriation must go each year to the maintenance and the preservation of roads already built since it is cheaper by far to maintain roads than to rebuild them.

As provided by law, the Bureau of Public Roads continues to approve the location, type, and design of Indian Service road construction and the relationship of this recognized road-building agency of the Government, with the Indian Service, has been very friendly and cooperative.

ARTS AND CRAFTS AS SOURCE OF INCOME

The vitality and integrity of Indian arts and crafts still persist. Evidence is the fact that many of the Indians' finest creations are still made for ceremonial and personal use. From the point of view of income to the Indian, however, Indian arts and crafts have suffered from several handicaps: limited markets, lack of standards, demand for low-priced, rather than quality goods; and lack of concerted effort to establish public interest in superior and authentic products. Primarily to increase income to the Indians from the sale of their arts and crafts products, the Indian Arts and Crafts Board was established 2 years ago, with a modest appropriation. Since the Board's inception, standards of genuineness and quality for various arts and crafts products have been put into effect and the search for new markets has been vigorously pushed.

It is the Board's policy in developing markets for Indian goods to stimulate, guide, and protect that work now being done by Indians

which satisfies the needs of the present market; further, to stimulate supplementary production of superior merchandise for the discriminating market. This course it is felt will establish a reputation of fine craftsmanship for Indian goods and will give the best artists an opportunity to exploit their abilities.

In furtherance of this policy, the Board is endeavoring to help the Indian producer and the trader to present Indian wares in an attractive manner, and to participate in various Indian exhibits featuring the use of Indian craft objects in modern settings.

Various specific projects have been initiated by the Board during the past year. These have included a system for the marking—to prove authenticity and quality—of Navajo, Hopi, and Pueblo silver, and of Navajo textiles; the development of a home spinning industry in eastern Oklahoma, with an organization of 75 spinners (all of whose output has been marketed); and the formation of arts and crafts groups on three South Dakota reservations, which have been developed with the aid of a Board staff member. Survey work looking toward improved production of Indian arts and crafts has been carried on in North Dakota; in Alaska—where superb crafts objects are still being made; and in eastern Cherokee, North Carolina, where the short-season tourist market for basketry, woodwork, and pottery needs expansion. In cooperation with private persons, an arts and crafts project is being developed at DeSmet, Idaho, and improvement in the quality of goods produced has already become evident.

EXHIBITS AND EXPOSITIONS

Exhibits and expositions offer a powerful instrument of public education in the beauty and usefulness of Indian arts and crafts products. Board staff members have spent considerable time in the gathering of vivid, authentic exhibits for three expositions which, at the close of the fiscal year, were still in the future: The Intertribal Ceremonial at Gallup, N. Mex., in August, where, for the first time, the importance of display in the sale of Indian goods was to be stressed, and the theme of the usefulness of Pueblo arts and crafts in the modern home was to be demonstrated; the American Indian Exposition in Tulsa, Okla., scheduled for October; and the Golden Gate International Exposition to be held in San Francisco in 1939. This last-mentioned exhibition will be of especial importance in furthering interest in the Indian cultural heritage and in Indian crafts.

The Indian Arts and Crafts Board does not wish to delude the public, the Indians, or itself into assuming that increased arts and crafts production is the answer to the Indians' economic problems. The number of Indians interested in, and capable of, superior arts and crafts work cannot be indefinitely expanded; and there is a limit also to the amount of the goods which the market can absorb. But this

much is certainly true: that the top limit has not nearly been reached; and in reaching it, a number of Indians can support themselves in crafts work, and a much larger number, especially of women, can augment their incomes from this source.

ENFORCING LAW AND ORDER

Upon Indian Service and the organized Indians falls the grave responsibility of law and order on Indian reservations and on Indian restricted land. Also primarily an Indian Service responsibility is the enforcement of statutes against the sale of intoxicating liquor to Indians.

Liquor and its control continues the major problem in the field of enforcement among the Indians. From Indian groups have come requests for a modification of the present statutory prohibition against the sale of alcoholic liquor to Indians. Noteworthy among these requests during the past fiscal year were those from the Klamath Tribe of Oregon and from the Flathead Indians of Montana. Bills were introduced in Congress to repeal the statutes which prohibit the sale and possession of liquor on Indian reservations insofar as they apply to and affect the reservations of these two tribes. The Indian Office and the Department gave pronouncement to a policy decision of major importance in sending to Congress a favorable report on the Klamath repeal bill. Recommending certain amendments designed to place the major responsibility upon the Indians themselves and to establish a system of control by permit and license, the report stated plainly a belief that the present prohibitory laws applying to Indians are quite unenforceable on many Indian reservations, which are mere islands within the surrounding white life. It was explained that on some of the closed reservations the Indian liquor laws may be enforceable, but that on others where Indian lands are scattered among white holdings and where Indian traditions and Indian blood have been diluted by contact with the whites, a vigorous public opinion, hostile to the liquor laws, has developed among the Indians and a resentment has grown up against what the Indians hold to be a discrimination against them and a stigma of inferiority. Neither the Klamath bill nor the Flathead bill made progress in Congress, but it is felt that a sign post has been set up pointing the way, it is to be hoped, toward a statutory formula which will bring about a realistic handling and an effective control of the liquor traffic among the Indian population.

The law and order problem is the combined one of education, of development of Indian responsibility, and of enforcement of the law. Indians in general are as law-abiding as their white neighbors. As has been pointed out, most of the serious crimes committed by Indians have intoxicating liquor as a contributing cause. No small part of

the Indian Service law enforcement problem lies in the failure of many whites to recognize the validity of the Indians' property and personal rights.

Except for the 10 major offenses of murder, manslaughter, rape, incest, assault with intent to kill, assault with a dangerous weapon, arson, burglary, robbery, and larceny, Indian law and order cases are tried in tribal courts by Indian judges. A number of tribes, by authority of the tribal constitutions adopted under the Indian Reorganization Act, or as one of their inherent powers, have written their own law and order codes. Until they have adopted their own codes, tribes are subject to the general law and order regulations of the Department. A tribe may substitute its own code, subject to departmental approval, for the general code. These codes are, in their own areas, the law of the land.

The division of authority between State areas and Indian areas has in some places, especially on reservations broken up by allotment, created problems of jurisdiction; these are gradually, however, being clarified. The Indian tribes of one State have definitely recommended that they and their reservations be made subject to the State criminal laws and the State courts.

The adoption of tribal law and order codes brings to the fore the problem of training Indian police officers and judges. In this problem, the Indians must have, and are receiving, help from the Indian Service. Continued effort, both by Indians and by the Service, is essential in obtaining capable and well-informed Indian personnel and successful handling of this phase of self-government.

Prevention of delinquency, so inevitably bound up with economic factors, is ever-present in our thinking, and needs more attention in Indian Service law-enforcement work. So meager are our funds for law enforcement work, however, that in general only the prosecution of violations, rather than their prevention, can be undertaken by the law-enforcement division. Preventive work is being done on a number of reservations in the schools and the agency forces.

Thirty special officers and deputy special officers were employed during the past fiscal year; others were deputized as special officers in connection with their own regular duties; there were 198 Indian policemen and 67 Indian judges. Fines were collected in the amount of more than \$31,000; 2,313 criminal cases were instituted by regular Indian Service officers, of which 90.34 percent resulted in convictions. A large proportion of these were not offenses by Indians, but by whites, against the property and personal rights of Indians. Cases involving the sale of intoxicating liquor by whites to Indians were, as usual, numerous. Several thousand gallons of intoxicating liquors were seized, and 7,000 pounds of marihuana.

INDIANS AND SOCIAL SECURITY

The Indian, like everybody else, grows old and helpless. The Indian, too, deserves at least a degree of economic security in his old age.

In even the short time it has been available, the public assistance of the Social Security Act has been an important help to the Indian. It has helped, first and fundamentally, in meeting the Indian's actual, and often acute, subsistence needs. Secondly, the collateral case work of State and county public welfare departments has helped the Indian to make many necessary adjustments.

There have been difficulties due to the status of Indian property as well as to the status of the Indian himself. Tax-exempt Indian land has created a problem in those communities where the public assistance programs are financed partly from county funds which, in turn, are based on property taxes. Several States have solved the problem by using State funds to pay both the State's and county's share of assistance to Indians.

A certain amount of delay in certifying eligible Indians to the program has been due to a confusion which Miss Sue M. White, attorney in the General Counsel's office of the Social Security Board, deplores as "an erroneous generalization that Indians already receive help from the Federal Government."

In her study, *Indians in Social Security*, Miss White traces this to "an honest misunderstanding of the extent to which the Indian Service has been enabled to grant direct relief from appropriations greatly inadequate for the purpose." She further points out that the administrative agents of Federal-State assistance are, in increasing numbers, beginning to look specifically at the facts in each case, rather than to accept "a mere general impression that all Indians are adequately provided for out of some special appropriation separate and apart from the general Social Security program."

The Indian's status as a ward of the Government is sometimes misinterpreted as grounds for ineligibility for benefits. The absence of individualism of Indian family life is another barrier to effective local administration of the program.

EXTENT OF PARTICIPATION

In spite of these difficulties, progress is being made.

At the present time, throughout the United States and Alaska Indians are participating in the public assistance program.

In a survey of October 15, 1937, the Superintendents of the Indian agencies reported that 6,451 Indians were being helped by Social Security. Today, the actual figures are considerably higher than these because, since the above computation was made, participation

has materially increased; and many Indians, not affiliated with any agency and, therefore, not included in the report, are receiving public assistance under the Social Security Act.

In certain of the States, Indian children are sharing extensively in specific State social services—maternal and child health, work for crippled children, child welfare, vocational rehabilitation—sponsored by the Children's Bureau, and the Office of Education, but administered (title V, Social Security Act) by the States.

In all this work the Indian Service personnel act as the liaison between the individual Indian who asks assistance and the county and State public welfare departments who administer assistance through the Social Security program.

The goal proper and possible, is that the Social Security Act shall operate as fully for the needy Indian citizen as for any other needy citizen.

INDIAN HEALTH

Through hospital and sanatorium service, nursing work, immunization programs, clinical work and health education, the Indian Service is working to better the Indians' health. In areas where other service is not available, which means most Indian areas, the Indian Service does this work itself. In a few areas where Indians live scattered among whites, the Indian Service has worked out cooperative arrangements with States and counties for health service.

The Indian Service during the past year maintained 79 general hospitals with 2,968 beds and 362 bassinets, and 14 sanatoria with 1,342 beds. A total of about 1,850 health workers were employed.

TUBERCULOSIS STILL GREATEST INDIAN SCOURGE

Tuberculosis continues to be the most dangerous enemy to Indian life. There are, however, heartening indications that a natural immunity is gradually developing among the Indian people. Reports from the Phipps Institute in Philadelphia, where many thousands of X-ray films are read and interpreted, apparently point to the fact that a number of cases of tuberculosis have resulted in natural cures without the patients' having known of their tuberculous condition.

An apparent increase of tuberculosis on certain reservations can be traced to the greater effectiveness of surveys. For example, a survey completed on the Pine Ridge Reservation where 17 percent of 3,700 Indians examined showed some type of chest lesion, resulted in the classification as tuberculous of 60 Indians who were subsequently sent to the new Sioux Sanatorium at Rapid City.

The tuberculosis vaccination program is making progress. The vaccinated and control groups are being followed up and illnesses are being checked. To date, 1,559 children have been vaccinated and an

equal number of controls are being watched. This work is now in progress at the following agencies: Pima, Ariz.; Wind River, Wyo.; Rosebud, S. Dak.; and Turtle Mountain, N. Dak.; and among the Alaskan natives near Juneau.

INDIAN SERVICE PIONEERING IN TRACHOMA RESEARCH

The eye disease, trachoma, prevalent among Indians, has been a major field of Indian Service medical research during the past fiscal year.

What is believed to be the actual cause of trachoma, a filterable virus, has been demonstrated as the result of cooperative work by the Indian Office and Columbia University at the Trachoma School on the Fort Apache Reservation, Arizona. The important findings were reported before the Ophthalmological Section of the American Medical Association at San Francisco in June 1938. The conclusion was presented that "trachoma is a virus disease and that its epithelial cell inclusions consist of masses of virus embodied in a matrix consisting largely of glycogen."

Startling reports were received from doctors working on the Rosebud Reservation of apparent cures or arrestments of trachoma obtained by the oral administration of sulfanilamide. The reports stimulated intensive study of this treatment. Results so far have been encouraging. Experiments on baboons at the Fort Apache Research Center have resulted in rapid improvement. Findings were presented in the form of a progress report before the American Medical Association at its June meeting.

The year showed continued improvements among the children at the Fort Apache Trachoma School. Similarly encouraging results were obtained at the Indian School at Chemawa, Oreg., where emphasis is being placed on the care of the trachomatous child.

CONTAGIOUS DISEASES FOUGHT

Immunization programs against contagious disease were carried forward. There were reported 754 cases of chicken pox, 865 cases of measles, and 261 cases of whooping cough. These totaled less than during the previous year. Cases of influenza were somewhat more numerous, approximately 14,168. In no instance, however, did influenza become a serious epidemic. The number of small-pox cases reported was 24.

The Navajo Reservation was visited by several diseases in epidemic proportions. During the fall and winter, 45 cases of typhoid developed, with 9 deaths. The probable source of the disease was ditch water which was found to be heavily contaminated. The bacteriological laboratory of the George Washington University in Washington,

D. C., aided materially in combatting the epidemic by examining cultures and laboratory specimens which were sent to Washington by airplane, packed in dry ice. Typhoid vaccine was liberally supplied by the Army Medical School, Washington, D. C., and 2,880 Indians were inoculated.

Rabies (hydrophobia) among dogs appeared on the Navajo Reservation in January. Four Indians and eight whites were bitten; 11 of these persons were known to have been bitten by rabid animals. All persons bitten received the Pasteur treatment and none has developed the disease. In all, 26 dogs were killed on the reservation and others in whom the disease was suspected were impounded as a precautionary measure.

COOPERATION WITH STATES STRENGTHENED

The advent of the Social Security Act entailed a revision of existing cooperative programs with State health departments. In Minnesota, for example, the Indian Office took advantage of the appointment of one or more public health nurses in Cook, Lake, St. Louis, and Carlton Counties who worked under the supervision of a full-time health officer and a full-time nursing supervisor. The Indian Office added to the State budget the sum of \$2,400 which had heretofore been used to maintain one Indian Office nurse who had attempted to serve the many Indians in this large area. In return for this contribution, the county nurses now render service to whites and Indians alike.

Another service financed entirely by the Indian Office has been the establishment of a district unit under the Five Civilized Tribes, Muskogee, Okla. An Indian Service nurse has been made nursing supervisor of this area. The plan calls for a county nurse to be placed in each of the counties involved. It is hoped to develop this area as a teaching field for field nurses new to the Indian Service.

Closer cooperation has also developed with existing Federal nursing services in program development. There has been an increase of Civil Service transfers to the Indian Service from other Federal agencies. This has made it possible to fill some of the existing vacancies in both hospital and field positions.

During the year five additional Indian Service physicians were appointed, with the approval of the Secretary, as Deputy State Health Officers, bringing the Indian Office into very close relationship with State health organizations. The District Medical Directors are in constant contact and association with the State health authorities and have been of material assistance in bringing about these helpful cooperative relationships.

Cooperative relationships were continued with the Public Health Service and the De Lamar Institute of Public Health, Columbia

University, in the investigation of epidemic diarrheal disorders in the United Pueblos areas, where the infant death rate and morbidity rate for all ages, from dysentery, has been extremely high. It has been found that the Shiga bacillus is the agent chiefly responsible, although many persons have been found to be carriers of the amoeba histolytica. At public expense, during the winter insanitary privies were replaced by sanitary types. During the following summer, 1937, the total incidences of diarrheal disease were low and the carriers of infectious agents had declined. No such decline in incidence has taken place in areas in which only a portion of the population has been provided with sanitary arrangements for sewage disposal. It is the opinion of the investigators in this field that complete sanitation appears to provide effective protection and that partial sanitation is of little value. The results of these experiments, now that the diagnosis and treatment have been reported, should prove effective in the sanitation of Indian pueblos where this disease is prevalent.

ENGINEER CORPS AIDS IN SANITARY ENGINEERING PROBLEMS

The Engineer Corps of the Public Health Service continued to render outstanding service pertaining to sanitary engineering at the various field stations. In all, 71 agencies or institutions were visited and surveys made. Sixty-two conferences were held regarding sanitary conditions, 21 water treatment plans or reports were prepared, and 25 sewage treatment plans or reports prepared. In all, 49 Indian Service plans pertaining to sanitary engineering work were reviewed. This service has been of immeasurable help in the improvement of sanitary facilities at the various reservations.

DENTAL SERVICE

Dental treatment was given to 22,536 Indian patients by field dentists and to 4,779 patients by resident dentists; 48,708 treatments were given. Of special interest is the fact that the Navajo Tribal Council petitioned Congress to set aside \$5,000 of their tribal money for the development of a dental unit in the new hospital at Fort Defiance on the Navajo. This was done and the Indians expect to reimburse the tribal fund by the payment of dental fees.

NEW HOSPITALS OPENED

Three new hospitals were opened during the fiscal year: That at Warm Springs, Oreg., with 21 beds; the Sioux Sanatorium at Rapid City, with 112 beds; and the Navajo-Hopi Medical Center at Fort Defiance, Ariz., with 126 beds. The opening of the hospital at Fort Defiance was unusual in that representative Navajo medicine men participated, with healing chants, speeches, and offers of cooperation.

MEDICAL PERSONNEL

The medical personnel of the Indian Office at the close of the fiscal year included 10 administrative and supervisory physicians, a supervising dentist, 9 supervisory nurses, 159 whole-time and 96 part-time field physicians, a special expert in tuberculosis, 3 special physicians for tuberculosis, 12 special physicians for trachoma, 23 consultants, 15 whole-time and 11 part-time dentists, 111 field nurses, 441 hospital nurses, 16 nurses at large working with special physicians, 9 assistant medical technicians, and more than 900 other employees. These show an increase of about 200 over 1937, due in large part to the opening of new hospitals, with some additional employees to provide better service at existing facilities.

HEALTH WORK AMONG ALASKA NATIVES

The Indian Service is charged with the task of promoting health work among natives of Alaska. For this work, the Indian Service maintains a technical staff of 63 health workers, made up of a director, a dental supervisor, a supervisor of nurses, 10 full-time physicians, 6 part-time physicians, 30 field nurses, and 20 hospital nurses. In addition, there are subordinate hospital employees, most of whom are natives. The vast distances, the cold, and the poor economic conditions in many of the native villages complicate the problem.

The Service operates 7 hospitals in Alaska; and in addition makes use of 12 private hospitals on a contract basis. Two additional Government hospitals in Alaska also furnish hospitalization to natives, and two Indian Service hospitals in Washington accept Alaska natives as patients. Preliminary planning work has been completed on a new hospital at Bethel. Construction on the new hospital at Point Barrow is nearing completion; finishing materials are being sent up on the Indian Service steamer *North Star* during the summer, and the hospital will be completed by January 1, 1939.

Dental service is furnished under contract on a fee basis by 16 local dentists. Most of these men visit nearby native villages at intervals as well as provide dental service at their own offices. The dental supervisor does dental work in districts not reached by the contract dentists.

The survey of dental conditions and research work among Eskimos in the Kuskokwim River region carried on in past years by Dr. L. M. Waugh of Columbia University and the Indian Service was resumed during the closing months of 1938 by Dr. Donald Waugh. The dental supervisor has been taking an active part in this work.

FIGHTING TUBERCULOSIS IN ALASKA

Tuberculosis continues to ravage Alaskan natives, whose death rate from this disease is about 10 times that for the United States as a whole. Since the number of sanatorium beds available in Alaska, 32, is insufficient to make any real impression on the situation, increased efforts have been made to locate the open cases and to teach the natives the importance of segregation of those infected, and particularly the importance of protecting young children. Living conditions of natives make for tremendous difficulties in dealing with the disease; educational work, however, is gradually showing some results.

At the two vocational schools, Wrangel and Eklutna, the plan for retaining early cases for treatment at school, inaugurated at the close of last year, was continued with excellent results. A number of children were kept at school under treatment during the summer with the result that most of them were able to return to school work in the fall.

The Territorial Health Department again has carried on the tuberculin testing and X-ray survey work which has included natives. Of 1,009 natives X-rayed and examined, 134 were diagnosed as positive for tuberculosis.

The vaccination program was inaugurated in southeastern Alaska, with the cooperation of the local health personnel. A total of 497 children were vaccinated with the Calmette vaccine and 447 were classified as controls.

COMMUNICABLE DISEASES

Among other communicable diseases, the continued occurrence of epidemic meningitis in the lower Kuskokwim region was striking. Strenuous work by Indian Service personnel curbed the spread of the disease. As the constant recurrence of isolated cases seems to indicate the presence of carriers, plans were made and work launched in cooperation with the Territorial Health Department for a careful survey and laboratory investigation of this problem.

Whooping cough reached serious proportions in the Cook Inlet and Kodiak areas; mumps was widespread, but not severe. No diphtheria or smallpox was reported, satisfying evidence of the efficacy of the vaccination program against smallpox and the immunization of children against diphtheria. Venereal diseases have been common in the larger towns, and are being treated vigorously. There are few cases in the remainder of the Territory.

FIELD NURSING SERVICE

Field nursing work must vary in accordance with local conditions; in general, however, we try to conduct a broad public health and educational program in addition to giving medical relief. Midwife training has been given special attention, and first-aid instruction with teachers and help in school health programs has been stressed.

COOPERATION OF OTHER AGENCIES

The United States Coast Guard has rendered invaluable aid in this scattered field, in transportation, and in actual health treatment work, including surgery. The Territorial Health Department has continued its close cooperation with the Indian Service, and the two organizations are carefully coordinating their programs.

Immunizations Against Contagious Disease During Fiscal Year 1937

	<i>Number of persons immunized</i>
Smallpox.....	11, 498
Typhoid.....	10, 609
Diphtheria.....	8, 384
Rocky Mountain fever.....	1, 146
Tetanus.....	224

INDIAN EDUCATION IN 1938

It is the task of the Indian Service to build upon the Indians' past, and upon the whites'. Both backgrounds have given richly to the world in material development, in spiritual forces, in creative expression of the arts. How to draw on the rich store of the past so that the Indians' lives today may be more satisfying and significant is the challenge thrown down to Indian Education.

It is not enough that we try to make the Indian self-sufficient so that, perhaps in our time, he may be economically on a par with the rural white man. The Indian has brought into our civilized life a philosophy of his own; an often under-rated sensitiveness to life, to nature, and to human beings; and a whole set of values not—like so many white concepts—based upon concern over his present needs or fear for the future. If there exists anywhere on earth a group of human beings attuned to nature, the Indians are that group. Yet here they are completely surrounded and in every possible way dominated by a civilization relatively new and in many ways alien. The staff of Indian Education, therefore, must never lose sight of the fact that what we give to Indian children as their basic formal education is all that they will ever receive. The Indian Service sets the boundaries. They, and the community, take the consequences.

Indian School Population and Enrollment During the Fiscal Year 1938

Total number of Indian children reported.....	¹ 86,747
Indian children 6 to 18.....	86,913
Total number enrolled 6 to 18.....	65,166
Public.....	² 33,645
Federal day.....	13,797
Federal reservation boarding.....	4,769
Federal nonreservation boarding.....	5,412
Mission, private, and State day.....	2,039
Mission, private, and State boarding.....	4,936
Sanatoria.....	433
Special schools.....	³ 135
Definite information not available.....	² 8,457
Not enrolled in any school.....	² 10,290
Eligible for enrollment.....	² 9,087
Not eligible for enrollment.....	1,291
Under 6 years and over 18 in all schools.....	2,834

¹ An apparent decrease in the number of Indian children this year from last year is accounted for by the fact that reports for the Five Civilized Tribes Agency, Oklahoma, cover only children having one-fourth or more Indian blood.

² It is estimated that 10,000 of these children are enrolled in public schools away from the reservation, in addition to the number known to be in public schools, making an estimated total of 43,645 in public schools.

³ Including colleges and universities.

Translating this into concrete reality for 1938 the following statements of fact may convey the picture.

VOCATIONAL EDUCATION STRESSED

Profiting wherever possible from the best practices in white public and private education, the Indian Service is developing a diversified school program aimed at the specific needs of each region in which Indians live.

The actual adjustment of Indians to white civilization varies greatly in different areas. Nowhere is it complete. Thousands of Indians, for example, do not speak English. Among the Navajo, for instance, it is estimated that more than 90 percent neither speak nor understand English. This, itself, creates special educational problems.

Land use is another challenging problem. Until faced with the ravages of soil erosion, due largely to overgrazing, the Navajos were self-supporting and self-sufficient. They perpetuated their ancient culture with a minimum of adjustment to neighboring whites. Today, education is a powerful force in helping these people bring back their land to its former productivity. The alternative is slow starvation.

Assimilation has become a very real problem. In areas such as Minnesota, Washington, and California, where assimilation of Indians is proceeding rapidly, Indian children are taken care of in public schools. In recognition of the exemption of Indian lands from taxation, the

Federal Government pays the school districts for such services. During 1938 approximately \$1,045,000 was spent for Indian education in district schools and \$378,000 was paid to the States.

BOARDING SCHOOLS DECREASING

Indian boarding schools have decreased in number and day schools have greatly increased. Instead of breaking up Indian home life, the present policy is to preserve and strengthen home ties. In 10 years, the Indian day school population has risen from 4,532 to 14,087.

Vocational secondary education is provided for a steadily growing number of adolescent Indians. In the last 10 years the number of pupils enrolled in the tenth, eleventh, and twelfth grades has increased from 1,409 to 3,654.

By means of educational loans 546 Indian students were helped to go to colleges and vocational schools. By this means, more Indian young people are helped each year for positions of leadership in their own community.

Most of the Indian Service boarding school plants were either inherited from the Army, whose forts were often transformed into Indian schools, or were built in the 10 years from 1885 to 1895. The initial construction was often poor and the buildings unsuited to modern ideas of what constitutes a desirable structure for educational and group use. During the last 10 years a carefully planned reconstruction of the Indian school plants has been undertaken. Better dormitories have been developed. A cottage type of dormitory for smaller schools has been designed.

ADULT EDUCATION ADVANCES

Community programs have been an important part of the educational policy of the Indian Service for the last 10 years. A modern Indian day school contains, in addition to classrooms and living quarters for the staff, a kitchen for the preparation of a noon lunch and for cooking instructions for parents and children; a community room used by adults for a wide variety of purposes; a clinic for the use of the field nurse and traveling doctor; a laundry for community use in areas where domestic water is scarce; and shower baths and toilet facilities for use by pupils and adults.

In some instances adults who use the school facilities exceed in number the children in classrooms. Confidence in the schools on the part of the older Indians is on the increase. Improved practices in hygiene, in sanitation, and in soil conservation are being taught—and accepted by the Indians. Community discussions of tribal affairs, extension demonstrations, and similar activities are developing at a hopeful pace.

Vocational emphasis in education is increasing rapidly. For instance, the Oglala Community High School at Pine Ridge, S. Dak., is operating a beef herd of more than 800 head on a leased reserve of 30,000 acres. In Oklahoma, an 8,000-acre dry farm is being operated by the students of the Chilocco Agricultural School. These are but two of many instances of the way in which vocational education ties in with the actual life to which the student must return. Industrial shops training carpenters, auto mechanics, shoemakers, and similar artisans are scattered throughout the Indian country. Today the Indian Service operates 247 schools in the continental United States and 103 in Alaska. In all of these institutions the same practical objectives form a foundation.

The teaching staff in the Indian Service will stand comparison with that of any first-class American public school system. Gradually we are developing teaching materials fitted especially for Indian life. Since many Indian children live in areas remote from city life and possess citizenship relations to the State and national governments differing from those of white children, new and original material is needed. We hope within the coming year to publish the first of such materials.

This, then, is a picture of the actualities, the hopes, and the ideals which motivate the program of education for the Indian people.

REORGANIZATION AND SELF-GOVERNMENT ACTIVITIES

It is necessary to restate from time to time the historical processes underlying the administration of Indian affairs. It is necessary because repeatedly the question is raised as to why Indian lands should be tax-exempt, or why the United States should administer health, education, and other social services for the Indian population. In brief, why should the Indian be under guardianship?

WHY INDIANS' SPECIAL STATUS?

European colonizers and their descendants brought to America ideas of land ownership, morality, government, and religion which were meaningless to the native American. In time these ideas became dominant to the exclusion of Indian habits of thought. Since we were a humane Nation and were not bent on destroying the Indians, we assumed the responsibility of showing them how our ideas operated. We wanted them to learn our ways so that they could exist side by side with us. In other words, we instituted a system of Indian education which is with us today.

We took away from the Indian all but a tiny fraction of his wealth in land, water, and other resources, and even his food supply, insofar as that consisted of game and wild products; and by doing so we charged ourselves with the responsibility of keeping the Indian from

starvation. Furthermore, since the Indian's understanding of property differed from ours, it was obvious that he would not long retain the little property left him if he was not protected. That made it necessary to erect trust-barriers around him which would prevent predatory men from making off with the means by which the Indian was to be taught a new way of existing.

By placing trust-barriers around Indian property, we exempted his land from State and local taxation. In taking this action we were subjecting the Indian to possible discrimination on the part of the States which would have resulted in leaving him without health care, education, roads, or any of the services which a State renders its people. States and local communities cannot furnish services without revenue. Once again, then, it became necessary for the Federal Government to assume an obligation toward the Indian tribes whose property it was seeking to protect.

These are the factors which Congress and the courts have borne in mind when they have dealt with Indian questions. The historical process has been long and involved. A mass of rules and regulations has accumulated and is today operative in the Indian Service. It is not an inert mass, as so often is assumed. There are within it directional drives, the aim of which has always been to solve or to cure the fundamental dislocation of a people overwhelmed by a superior force.

We are now at work developing a policy which we believe to be broad enough and sound enough to achieve, if continued, the purpose for which the Indian Service has always worked—the Indian's adjustment to his new world and a termination of his "problem." That policy is based on two ideas—organization, and a fuller use of land. Out of organization will come greater participation in the management of property and domestic affairs; and out of land use, which contemplates the purchase of land for those now landless and credit to carry on operations, will come better living conditions. Fundamental to the program is a recognition of the right of Indian culture to survive and enrich the daily life of the individual and the group. Not humanitarianism alone, but a belief that human beings are at their best when they are left at peace in those matters of conscience which come closest to them, prompts this attitude.

Legislation was required to initiate the program, and in June 1934 the Indian Reorganization Act was written into the statute books. Four years have passed since then, with some notable results.

The Flathead Reservation: An Example

The Flathead Reservation in Montana, home of the Confederated Salish and Kootenai Tribes, was the first to be organized under a constitution and to be incorporated. It was a typical reservation of

the Northwest, where allotment had broken up an early start in stockraising, and later years had brought a gradual pauperization in resources and social stamina. Of the 1,250,000 acres belonging to the Indians in 1910 when allotments were made, no less than 750,000 of the best acres were lost within a period of 20 years. The stock business was smashed. One-half of the 1,400,000,000 feet of merchantable timber had been dissipated in unfruitful per capita payments. Drought and depression in late years left the 2,900 Indians exhausted and ambitionless.

The Reorganization Act saved to the reservation at one stroke a total of 192,425 acres of surplus land, land which had not been entered by homesteaders and which the Secretary of the Interior under the act was empowered to return to the tribe. This was not valuable land, but at the very least it will serve as a game refuge. The tribal council at Flathead is aware that land shortage is one of its most serious problems. The best agricultural acres have gone into white ownership and must be repurchased. The council is not willing to wait for the Government to purchase land with the funds made available by the Reorganization Act, but has already had introduced in Congress a bill which would permit the tribe to use for this purpose its own funds on deposit in the United States Treasury.

How successful Flathead has been in making use of the Reorganization Act is revealed in a single detail. Under its tribal constitution, the council has authority to meet its expenses out of available tribal funds. During the fiscal year 1938, acting under this constitutional authority, the tribal council submitted a budget calling for the expenditure of \$5,000 and requested the Secretary of the Interior to make available out of tribal funds the amount called for in the budget. The approval was given. At the end of the fiscal year a financial statement was rendered which shows that the tribal council spent a total of \$2,250.45; received as income during the year, \$7,134.21; and at the end of the fiscal period had a balance of \$4,883.76. It is almost universally believed that Indians are improvident with money and should not be called upon to handle money. This probably is one of the least excusable of the misconceptions which people have of the Indians.

Reading the minutes of the tribal council and of the credit committee which is administering the revolving loan fund of \$65,000, one is repeatedly struck by the good sense shown by council decisions and by the business-like manner in which the meetings are conducted. Flathead definitely is clearing a way out of its particular depression.

EIGHTY-TWO TRIBES ARE ORGANIZED

At the end of this fiscal year there were 82 tribes, with a population of 93,520 Indians, operating under constitutions and bylaws; and of these, 57 tribes, having a membership of 64,000 Indians, had

become incorporated under Federal charters. What this means can better be understood by explaining that these tribal constitutions contain specific grants of power, as follows: The right to negotiate with the Federal, State, and local governments, and to advise and to consult with the Interior Department on all activities which may affect the tribe; to approve or veto any sale, lease, or other disposition of tribal property which may be authorized or executed by the Secretary of the Interior or the Commissioner of Indian Affairs; to advise the Secretary of the Interior with regard to all appropriation estimates or Federal projects for the benefit of the tribe; to make assignments of tribal land to its members; to manage all economic affairs of the tribe, subject to the terms of a charter; to appropriate for public purposes any available tribal funds; to devise a system of taxation by which funds for tribal use may be obtained; to determine its own tribal membership; to protect and preserve wildlife and natural resources and to regulate the conduct of trade; to cultivate native arts and crafts and culture; to administer charity and to protect health and the general welfare of the tribe; to charter subordinate organizations for economic purposes; to regulate the domestic relations of its members; to regulate the procedure of its governing body. These are powers which the tribe may exercise without interference by any arm of the Federal Government.

Certain additional powers are subject to review or approval by the Secretary of the Interior, including the right to employ legal counsel, to exclude nonmembers from reservation lands, to govern the conduct of its own members and administer justice through a tribal court, to purchase for public purposes property under condemnation proceedings, and to regulate the inheritance of property other than individual allotments of land.

REVOLVING CREDIT FUND OPERATIONS

The Indian Reorganization Act, in recognition of the need of the Indians for credit, authorized the establishment of a revolving fund of \$10,000,000 for loans to Indian chartered corporations. The Oklahoma Indian Welfare Act extended the benefits of the revolving fund to Oklahoma Indians, and authorized an additional appropriation of \$2,000,000. The act of May 1, 1936, also extended the benefits of the revolving fund to Alaska. Of the amounts authorized, the following appropriations have been made:

	Total appropriation	Administrative expenses ¹
1939.....	\$400,000	\$120,500
1938.....	520,000	125,000
1937.....	980,000	65,000
1936.....	2,500,000	50,000
Total.....	4,400,000	360,500

¹ Amounts included in total appropriations.

Of the \$4,039,500 available for loans, the following advances and commitments to organized tribes all over the country had been made as of July 1: \$4,277,054.54 committed; \$1,861,605 advanced.

CHARTERED CORPORATIONS ACTIVE

Indian chartered corporations are proceeding wisely with their re-lending activities. Loans made to individual members have been principally for agricultural purposes. The main items purchased with the proceeds of loans have been livestock, machinery, and equipment. Although borrowers in some sections have had difficulty in making repayments due to drought conditions, on the whole the few repayments to the corporations which have so far fallen due have been made as scheduled. Loans are made to individuals only on the basis of sound plans; and unless climatic or other unforeseen factors interfere, repayments can usually be made from the proceeds of the financed enterprises.

A number of corporations are engaging in corporate enterprises, which are being conducted for the benefit of the members of the tribe as a whole.

THE NORTHERN CHEYENNES IN THE LIVESTOCK BUSINESS

The largest single undertaking is that of the Northern Cheyenne Tribe of the Tongue River Reservation, Mont., where a steer-feeding enterprise is being conducted. Grass is the biggest asset of this tribe, and livestock production is the only means of securing an income from this asset. The northern location of the reservation, and the scarcity of hay for winter feed, limit the number of cows and calves that can safely be carried on the range. Only about one-third of the range has been used by the Indians in the past, and the balance has been leased to white cattlemen.

Recognizing the desirability of utilizing its own assets to the utmost advantage, the corporation decided to enter upon a steer-feeding enterprise. Under the plan adopted, steers will be purchased each spring, run on the range two summers and one winter, and sold at the end of an 18-month period. Thus there will be twice as many steers on the range in the summer as in the winter. A total of 2,036 steers were purchased in the spring of 1937; they will be sold this fall. The steers were carried through the winter with a net loss of less than 2 percent. An additional 2,150 head were purchased this spring, and will be sold in the fall of 1939. It is planned to develop the enterprise so that within 10 years approximately 9,700 head will be carried on the range in the summer, and 4,800 head in the winter. Within 18 years, the corporation should be operating entirely with its own funds, since part of the profits are annually reinvested in the enterprise.

The Fort McDermitt, Nev.; Rocky Boy's, Mont.; and Fort Belknap, Mont., corporations, are all conducting corporate hay enterprises. Winter feed is also the limiting factor in the development of the livestock industry on these reservations. In recognition of this fact, the governing bodies of the corporations are attempting to meet the problem by raising and storing hay.

The Lac du Flambeau Indians are operating a tribal tourist cabin enterprise. The reservation is located in the heart of the tourist country of the Lakes States. At Jicarilla, N. Mex., the Indians are operating a tribal store.

Tribal corporations on the whole are taking a very business-like attitude toward credit in their consideration of applications. They seem fully to realize that credit offers an opportunity for the improvement of the economic status of their members, and that only by making sound loans which will be repaid can the purpose of the revolving fund be realized.

No loans have as yet been made in Alaska; one loan, for the operation of a salmon cannery, was under consideration at the close of the year.

CHARTER OPPORTUNITIES

The charter, as the term implies, is an instrument granting incorporation which permits a tribe to function as a business enterprise. Under its terms, which need not be repeated here, the tribes set forth the conditions under which they shall exercise their constitutional authority to manage their economic affairs.

One has only to review these powers to realize that immediate opportunities exist for a tribe to participate actively in the management of its resources and its domestic affairs. These opportunities entail responsibilities. The tribes must learn how to secure revenue, how to budget their funds, manage their land and other resources—in short, how to operate as a political entity and as a business venture. For a people who have had little experience in such matters, the task before them is formidable.

Striking as have been some of the achievements under the Indian Reorganization Act, its results are only at their commencement. In 50 years the current which would have destroyed Indian property and Indian culture had swollen to flood stage. It bore down and crushed all but those tribes which had escaped allotment. They alone—Menominee, Navajo, Duck Valley, the Pueblos, Papago, and a few others—stood like islands above the drowning waters. Floods cannot easily be checked or diverted; yet, we are attempting just that. The flood of 50 years of land losses is the problem we face.

The tribes themselves present problems of their own. Some are so poverty-stricken and so nearly dead in spirit that they only stand and

stare at our activity. Having no money on which to operate their government, the members of their governing bodies are likely to lose interest quickly or are carried off by jobs that pay them a living. The system of law and parliamentary procedure which the constitutions and charters contemplate in some cases is too much for a dispirited tribe to undertake. Organization field agents will continue to work with them and in time, we hope, will help them to find a way around their difficulties and will convey to them a sense of the opportunities which lie waiting for them. Follow-up work of this sort is vital to the whole program.

SOME IMPORTANT COOPERATIVE PROJECTS

Indian lands, and the use to which they are put, are never capable of being isolated. In a number of instances, Indian reservations constitute the predominant lands of critical watersheds. The comprehensive land-use programs of the Government need the participation of Indians, and have much to contribute to Indians.

Previous annual reports have recorded the development of cooperation between the Indian Service and other Federal agencies. The cooperation between the Soil Conservation Service and Indian Service in the Navajo, the Pueblo, and several other areas has gone forward successfully during the past year. The fact-finding and plan-making work of that division of Soil Conservation Service called Technical Cooperation, Bureau of Indian Affairs has been increasingly productive. The sheep genetics laboratory at Fort Wingate, N. Mex., a joint operation between the Indian Service and the Bureau of Animal Industry, continues its work. In the Rio Grande watershed, an Interdepartmental Rio Grande Board, whose creation was suggested by the Indian Service, now unites for common action three units of the Department of the Interior—the Indian Service, the Division of Grazing, and the Bureau of Reclamation, and four of the Department of Agriculture—the Soil Conservation Service, the Forest Service, the Farm Security Administration, and the Bureau of Agricultural Economics.

Seeking to develop programs of conservative land use among Indian tribes, the Indian Service and the cooperating agencies endeavor to subordinate technical programs viewed merely as such to Indian comprehension and the willing participation of Indians. Conserving Indian land is secondary to conserving Indian life; and using Indian land is secondary to using Indian native powers. In certain areas of Indian life, this policy has caused the land-use effort to move more slowly than would have been possible by the method of fiat. Even in these areas, the fable of the turtle and the hare will be illustrated if continuing patience and resourcefulness are supplied. In other areas,

of which the New Mexico Apache reservations and New Mexico Pueblos are prime examples, the way of working through and with the Indians has proved to be the swiftest way toward technical results both brilliant and lasting.

AREA PROJECTS

Second only in importance, in land-use programs, to the participation of the Indians themselves, is the participation of superintendents and their local staffs. And not only with respect to land-use programs, but equally with respect to health and school programs, and generally to the whole of Indian Service as realized within local areas, it is a matter of fixed policy that Indian jurisdictions, through joint action between the Indians, the local staffs, and the technical advisers from Washington, shall gradually forge out for themselves what are known as area projects, and that these area projects shall be the operating plans for the jurisdictions in question. To such area projects it becomes the business of the Washington office to accommodate its regulations and its overhead services. By this method, Indians gain confidence; the initiative and responsibility of the field personnel are increased; and stability of Indian policy, based upon realities local to the human areas of the Indians, is insured. Outstanding examples of the area project method, with its resultant establishment of a large degree of local autonomy within jurisdictions, are furnished by the Navajo and Pueblo administrations, the Five Civilized Tribes administration, and that of a number of organized tribes in diverse sections of the country.

Closely related to the policies and endeavors here set down are the rise of two interesting attempts by superintendents within large geographical areas to cooperate in the solution of their common problems. There has been formed a Southwestern Superintendents' Council, embracing all of the jurisdictions in New Mexico and Arizona, and a Northwestern Superintendents' Council, embracing all of the jurisdictions in Washington, Oregon, and Idaho. These councils, with approved constitutions and bylaws, with officers, and with meetings held at regular intervals, have brought to a focus many needs which, once defined, have been recognized as true needs with feasible solutions.

FINDING AND TESTING FUTURE ADMINISTRATORS

The Indian Service has moved swiftly from prescribed routines to experimental methods and local adaptations. The Indian Service administrator's task has become one of planning and leading; and it is a business operation of complexity and magnitude; it involves the manipulation of a considerable number of technical services, always with a view to their incorporation within local Indian life. Indian

administration calls for men and women with some creative endowment, much discipline, a capacity for suspended judgment joined with a capacity for taking action and for accepting the consequences of one's own initiative. It calls for an exceptional ability in dealing with superiors, with coordinate officers, and with subordinates. And finally, it calls for unusual endowments of efficient social and human nature; because an Indian Service which fails to enlist deeply the rank and file of the Indians, falls short in everything else, and enlistment must be of the heart as well as of the head.

Is it possible to identify in advance, through methods appropriate to the competitive civil service, those endowments, interests, psychological traits, personality characteristics, which give promise of a successful administrative career in Indian Service? Can past performance supply the evidences of such fitness or want of fitness in a candidate? How can the probationary period be so used as to reveal the presence or absence of essential traits, the having or not having of the power to overcome threatening weaknesses? What kind of pre-service or in-service training is needed, in order to meet this need which ultimately is the critical need in the Indian Service—the finding and developing of administrators?

In the main, the question must be asked not at the top administrative level, but at a level below the top one. The leading personnel problem of Indian Service is to find and equip subordinate or junior administrators, whose careers will be commenced in the local jurisdictions among the Indians.

ROCKEFELLER FOUNDATION GIVES GRANT FOR PERSONNEL EXPERIMENTATION

To try to find answers to the questions above set down, there has been established the Southwest Field Training School for Federal Service, administratively conducted under the Commissioner of Indian Affairs and the superintendent of the United Pueblos Agency. This activity is supported by a grant made by the Rockefeller Foundation through the Institute of Public Affairs, and the search for the men and women to be admitted to the experimental enterprise is a responsibility of the Institute of Public Affairs. Essential to the success of the experiment is the placement of the so-called field aides in positions of true responsibility, because in such situations alone can their vital abilities be finally tested. Essential, too, is the maintenance of performance records which shall supply an objective basis for competitive promotion; and the keeping and making of such records must not be confined to the members of the experimental institution, but should be extended to the regularly employed personnel as rapidly as knowledge is available and resources permit. A whole-time director of training, attached to the experiment at Albuquerque, not merely

works with and upon the so-called aides, but carries out job analyses within the United Pueblo and other jurisdictions, and it is his role to participate in the wider experimentation with records and with in-service training applied to the regularly employed personnel. The "aides" are not privileged persons in any sense of the word, but must meet, in qualifying for positions and in subsequent advancement, the tests of civil service and of the personnel system of the Interior Department and the Indian Office. The aides are given testing experiences also in other Federal services local to the experimental area.

Arising initially out of interest in the experiment above described, there has been created an Interdepartmental Committee on Problems of Personnel, made up of representatives of the Civil Service Commission and the Departments of Agriculture and Interior. This committee, whose functions are not administrative but advisory, and in the nature of research, deals with questions of personnel common to the agencies which make it up, and especially with those questions which lie upon that borderline where the Civil Service Commission and the executive organizations have their problems in common.

PERSONNEL ADMINISTRATION

The personnel work of the Indian Service continues to be one of the important elements upon which the success or failure of the carrying out of an Indian policy depends. Previous annual reports have referred to the extreme diversity in the types of personnel needed to carry out Indian administration.

The recruitment and training of persons for assignments to administrative posts continues to be of paramount importance. The drafting of civil service examinations designed to procure eligibles who are qualified to perform the various tasks required of them and who can make the necessary social adjustments to conditions under which persons at the various Indian Service field stations must live and work, has progressed with reasonable rapidity. Much work must still be done in this field, to insure a steady improvement in the quality of the service to be rendered by Indian Service personnel.

During the past year, the central personnel record system in the Indian Office has been completely overhauled and a modern visible system installed. Procedures in the handling of personnel work have been analyzed, and changes made which it is hoped will ultimately insure a more expeditious handling of personnel matters.

The method of evaluating quarters and other facilities furnished to employees of the Indian Service was very carefully analyzed, and a procedure guaranteeing a more equitable means of arriving at charges for such services has been worked out and placed into effect at approximately one-fourth of the field stations. It is hoped to complete this work within the year ahead. In service training schools, starting

in the Southwest, for the development of future administrators, are discussed elsewhere in this report.

On July 1, 1937, the beginning of the fiscal year, there were authorized in the Indian Field Service and Alaska 6,933 positions, carrying salaries in the amount of \$11,106,562. These figures include only permanent, year-round positions.

EMPLOYMENT OF INDIANS

From time to time, estimates have been made of Indians employed in the Indian Service but accurate statistics on this subject have not heretofore been available. As the result of a survey, in the course of which all Indians in the Indian Service were requested to fill out a questionnaire relating to their employment, it was found that as of April 30, 1938, there were 3,916 Indians employed in the Indian Service, of whom 3,627 were in regular, year-round positions. In other words, approximately one-half of the regular employees of the Indian Service are Indians. Slightly over 40 percent of the Indians employed proved to be full-bloods, and slightly more than 70 percent were of one-half or more degree Indian blood.

The Indian Service continued during the year to maintain a number of employment offices devoted to the aiding of Indians in securing employment. Some 4,000 Indians were placed in positions outside of the Indian Service as the result of the efforts of our employment service units. Of the 4,000 Indians placed in private employment during the year, some 2,500 went into permanent assignments. The demand for Indians for employment as household workers exceeds the available supply, and placements in this field have remained constant. There is also a continuing demand for technically trained and skilled Indian workers.

During the past year it was deemed advisable to discontinue the employment office at Gallup, and to establish an employment unit at Billings, Mont. Heretofore, no direct employment service for Indians has been available in the northern Great Plains area.

GOVERNMENT CONSTRUCTION

A total appropriation of \$2,047,500 was made available to the Indian Service for the construction and repair of buildings and utilities during the fiscal year 1938. A large part of the appropriation was used for making necessary repairs and improvements to water and sewer systems in the Northwest. The largest single item was for the construction of a hospital plant, including quarters for employees, at Crownpoint, N. Mex., on the Navajo Reservation.

During the fiscal year 1938, numerous projects financed from the Public Works appropriation were completed. Most important of these projects were the sanatorium and general hospital at Talihina,

Okla.; a hospital and laboratory at Fort Defiance, Ariz.; and the construction of units for the hospitalization of Indians at the Weimar and Wishiah sanatoriums in California.

For the fiscal year 1939, an appropriation of \$2,061,000 was made available in the regular act, and in addition the sum of \$5,313,000 has been allocated from the appropriation for the construction of public works.

Field construction offices are maintained at Albuquerque, N. Mex.; Billings, Mont.; and Muskogee, Okla.

INDIAN POPULATION

The statistics of the Indian population in the United States tell a significant story. Reports submitted by Indian Agencies under supervision of the Office of Indian Affairs show that while this vital race of people has more than held its own in numbers, it is gradually losing its racial identity and slowly but surely is blending with the surrounding population.

During the past 8 years, the number of Indians on current census rolls at Federal agencies has increased at the rate of approximately 1.2 percent per year. This compares with an average annual increase for the population at large, as estimated by the Bureau of the Census, of only 0.7 percent over the past 7 years.

But while the enrolled Indian population is on the increase, the number of full-blood Indians is decreasing in proportion to the total Indian population. In 1930, 64.5 percent of the Indians on census rolls were full-bloods. In 1937, the figures show that the percentage had dropped to 60.5. In other words, if the present trend continues, the day will come—except perhaps on certain reservations in the Southwest—when there will be few full-blood American Indians left.

The total Indian population under the jurisdiction of the Office of Indian Affairs, as of January 1, 1938, was 342,497. As of January 1, 1937, the number was 337,366, denoting an increase of 5,131. In addition to this Indian population, the Indian Office had under its jurisdiction the education and medical relief of approximately 30,000 natives of Alaska—a total responsibility, therefore, for the welfare of more than a third of a million Indians and Eskimo citizens.

Of the Indian population in continental United States, 96,723 Indians, or 28.2 percent, are in Oklahoma. Arizona follows with 46,255 Indians, or 13.5 percent; and then New Mexico with 36,078 Indians, or 10.5 percent. Thus, 179,056 Indians, or more than one-half (52.2 percent) of the total Indian population of the continental United States are found in these three States. (See Table Q.) Next in rank after these three States, in the number of Indians, are South Dakota, with 28,030, or 8.2 percent; and California, with 23,637, or 6.9 percent. If the number of Indians enrolled in the five States

of Montana (16,341, or 4.8 percent), Minnesota (15,906, or 4.7 percent), Washington (13,741, or 4.0 percent), Wisconsin (12,467, or 3.7 percent), and North Dakota (11,208, or 3.3 percent) are added, it will be seen that nearly 88 percent of all Indians in the continental United States are to be found in 10 States. The remainder of the Indian population is widely scattered with less than 2 percent of the aggregate number in any one State.

FULL-BLOOD RATIO DECLINING

It is only within recent years that statistics have been gathered which approach reliability concerning the blood quantum among Indians. As is to be expected, it is found that among many tribes, particularly in the Great Lakes and the Great Plains areas, where contact with the whites was comparatively early, the number of full-bloods has been relatively low for some time. And it is in these areas, of course, that the decrease in the number of full-bloods is most marked.

Considering the Indian population at large, a comparison of the degree of blood of Indians on census rolls at Federal jurisdictions for the years 1930 (April 1) and 1937 (January 1) reveals a downward trend in the ratio of full-blood to mixed-blood Indians of slightly more than one-half of 1 percent per annum. As was noted above, the greatest relative decline was in areas where the ratio of full-blood to the total number of Indians was lowest. During the period from 1930 to 1937, the total Indian population on census rolls at Indian Office jurisdictions increased over 10 percent, representing an increase among Indians of mixed blood of approximately 22 percent, and among Indians of full-blood of 3.5 percent.

The statistics gathered by the Indian Service are in general supported by the findings of the United States Bureau of the Census. According to the Census figures, during the 20-year period from 1910 to 1930 the percentage of full-blood to total Indian population declined in all states having a large Indian population. Census figures show that a full-blood ratio of 62 percent in 1910 dropped to 52 percent in 1930.

Indian Office data show that the Southwest is the last stronghold of the full-blood. Although New Mexico and Arizona contained only about one-third of the total Indian population on current census rolls at jurisdictions in both 1930 and 1937, more than one-half of the full-blood Indians in both these years were in these two southwestern States. In 1930, of the total enrolled Indian population in Arizona and New Mexico, 98.4 percent were full-bloods, while in 1937, full-bloods constituted 97.6 percent of the total number. The principal tribes in these two States are the Navajo, Pueblo, Papago, Hopi, Pima and Apache.

CHIPPEWAS' RAPID ASSIMILATION

In contrast to the situation in the Southwest, the lowest ratio of full-bloods to total population is found in Minnesota among the Chippewas, the largest of the Algonquian tribes, of whom only some 15 percent are full-bloods. Illustrating the rapid decline of the full-blood population in the predominantly mixed-blood areas, if Indians enrolled in the States of New Mexico and Arizona are excluded, it will be seen that the percentage of full-blood to the total Indian population would have declined from 46.4 percent in 1930 to 41.7 percent in 1937, a drop of 4.7 percent during the 7 years.

A mixed-blood Indian may marry anyone; any resultant progeny will be mixed-bloods. For the full-blood, if the offspring are to maintain the tradition of racial purity, the choice of a spouse is confined to full-blood groups. It is obvious that the full-blood group can increase relatively only as a result of a higher birth rate or a lower death rate, or both, than prevail among Indians of mixed-blood.

INDIANS OF ALASKA

Education and medical supervision over the natives of Alaska was transferred to the Office of Indian Affairs on March 16, 1931. Of Alaska's total population of 59,278, according to the last census enumeration of the United States Bureau of the Census taken as of October 1, 1929, 29,983, or 50.6 percent, were recorded as Indians. Of this number, 19,028 were Eskimauan, leaving 10,955 of other linguistic stocks.

ERROR MARGIN CONSIDERABLE

Despite recent improvements in census taking, reporting, and recording, vital statistics with regard to the Indian population still contain admittedly a considerable margin of error. The vast extent of the larger Indian reservations and the scattered and isolated pattern of life of many of the Indian tribes make the gathering of population data an extremely difficult task. For example, it has been possible to gather accurate data concerning the rate of increase of the Indian population for only an approximate two-thirds of the total number of Indians in the United States. It is believed, however, that the Indian groups covered are sufficiently representative to serve as an indicator of the currently normal growth in the Indian population.

It should be noted that the data in the following table showing Indian population by States, refer to the enrollment at jurisdictions within each State, and not to the number of Indians actually residing there. It is believed, nevertheless, that the Indian population of the several States differs by an extremely small margin from the figures presented in the table, since approximately 85 percent of all Indians

live within the jurisdictions where they are enrolled, and a great number of the remainder have not gone beyond the borders of their States.

A check on the accuracy of the figures compiled by the Indian Service is supplied by data from the decennial census of 1930. The census figures correspond quite closely to the figures of the Indian Service, so far as the ratio of Indian population in each State to the total Indian population is concerned, though the census enumeration of 1930, with regard to Indians dwelling in Oklahoma, Arizona, and New Mexico, shows some departure from the findings of the Indian Service reports. The census figures for 1930 showed only 49.8 percent of the Indians residing in these three States. It is probable that the census percentage is lower than the one shown by Indian Office data chiefly because Indians residing in various eastern States, of which the Indian Office has no record, were included in the census enumeration. Another reason for the higher Indian Office figures for these States is that there has been a slight tendency during the past 8 years for Indians to return to reservations.

Indian Population in Continental United States Under Jurisdiction of the Office of Indian Affairs, by State, Jan. 1, 1938

State	Number	Percent of total	State	Number	Percent of total
Total reported.....	342,497	100.0	Nebraska.....	4,619	1.3
Arizona.....	46,255	13.5	Nevada.....	5,370	1.6
California.....	¹ 23,637	6.9	New Mexico.....	36,078	10.5
Colorado.....	856	.2	New York.....	² 6,610	1.9
Florida.....	562	.2	North Carolina.....	3,391	1.0
Idaho.....	4,196	1.2	North Dakota.....	11,208	3.3
Iowa.....	460	.1	Oklahoma.....	⁶ 96,723	28.2
Kansas.....	2,047	.6	Oregon.....	4,741	1.4
Louisiana.....	² 70	(³)	South Dakota.....	28,030	8.2
Michigan.....	⁴ 2,404	.7	Texas.....	⁷ 326	.1
Minnesota.....	15,906	4.7	Utah.....	2,184	.6
Mississippi.....	1,947	.6	Washington.....	⁸ 13,741	4.0
Montana.....	16,341	4.8	Wisconsin.....	⁹ 12,467	3.7
			Wyoming.....	2,328	.7

¹ Includes 8,802 on jurisdiction census rolls, and an additional 14,835 on a special roll made pursuant to the Court of Claims Act of May 18, 1928.

² Estimated figures for the Chetimaha Tribe under Choctaw Agency, Miss.

³ Less than $\frac{1}{10}$ of 1 percent.

⁴ Includes 1,828 Indians organized under the Reorganization Act of June 18, 1934.

⁵ 1937 estimate.

⁶ Includes 24,097 on census rolls and 72,626 members of the Five Civilized Tribes as reported by the U. S. Bureau of the Census, 1930.

⁷ Members of the Alabama and Coushatta Tribes under the jurisdiction of the Kiowa Agency, Okla.

⁸ Includes an estimate of 500 members of the Cowlitz Tribe, Taholah Agency.

⁹ Includes 221 Rice Lake Band Chippewa (special census, July 1930) and 600 Stockbridge Indians, organized under the Reorganization Act of June 18, 1934.

NOTE.—Data are by State of jurisdiction where Indian is enrolled except Louisiana and Texas.

WHERE INDIAN SERVICE, OR THE GOVERNMENT'S EFFORT AS A WHOLE, STILL FALLS SHORT IN MEETING INDIAN NEED

1. The Allotted Land Situation

Touched upon in successive annual reports, this situation remains uncorrected and therefore gets worse each year. More allotted land passes into the heirship status, and the heirship allotments become

more hopelessly subdivided; administrative costs rise higher while allotted land yield grows smaller. Through allotment subdivision, there passes out of effective Indian use (or, indeed, effective use by white lessees) more land each year than can be added through new purchases with Treasury or tribal funds.

The methods, administrative and legislative, through which the allotted land situation can be alleviated, even cured, are known in detail. The year ahead will witness a concentrated effort to make decisive progress, administrative and legislative, toward solving the allotted land problem.

2. Indian Liquor Law Enforcement Imperfect

In Alaska, as yet, there is no liquor enforcement for the benefit of Indians. There is no legislative basis for such enforcement. In the United States, appropriations remain indefinitely inadequate if the effort at enforcement is to be continued throughout the Indian country.

3. Indian Appropriations Still Are Frozen

Only negligible progress has been made in lifting from the Indian appropriation bill the dead hand of past decades. Hundreds of frozen appropriation items still make difficult the efficient and economical use of Indian Service moneys. Things less important are done, things more important are left undone, under the compulsion of the system of frozen appropriations.

4. Uncertainty as to Who Are Indians

Due to treaty clauses, statutes, and appropriation bill clauses, it has come about in some areas that individuals with no more than a trace of Indian blood claim the advantages of Federal gratuity expenditure and are, in many cases, restricted wards of the Government.

Legislation limiting the use of gratuity funds to Indians of some specified degree of blood, preferably not too minute a degree, would assist in the adequate serving of those Indians who unequivocally are such, while at the same time diminishing the stress upon Federal appropriations.

5. The Unjust, Uneconomical System of Handling Indian Tribal Claims Against the Government Continues Unregenerate

In 1929, the Commissioner of Indian Affairs estimated that a century must pass before Indian tribal claims could be finally adjudicated. A century must yet pass; nor, under the system of hit-and-miss Indian jurisdictional bills, still prevailing, will equitable adjudication even then be attained. Legislation such as the Indian Claims Bill of 1936, defeated in Congress, is still the indicated remedy.

Indian Service Appropriations

APPROPRIATIONS FROM UNITED STATES TREASURY FOR FISCAL YEARS (INCLUDING DEFICIENCIES)

Object	1932	1933	1934	1935	1936	1937	1938	1939
General purposes.....	\$2,587,285.73	\$1,840,054.35	\$1,593,500.00	\$1,806,894	\$2,780,880	\$3,343,401.05	\$3,150,441.85	\$2,830,392.63
Industrial assistance.....	1,605,000.00	1,301,000.00	1,233,881.67	1,060,510	3,740,490	2,288,470.00	1,932,500.00	1,931,000.00
Irrigation and water development.....	497,601.00	457,824.00	599,614.00	450,665	1,321,652	1,149,664.00	1,293,998.00	1,317,196.00
Education.....	10,185,400.00	9,771,000.00	9,103,290.00	7,990,565	8,795,120	9,395,375.00	10,048,525.00	10,253,190.00
Conservation of health.....	3,658,000.00	3,508,800.00	3,281,800.00	3,264,565	3,849,620	4,422,360.00	4,965,690.00	5,432,000.00
Support of Indians.....	2,216,300.00	2,156,530.00	2,141,900.00	2,141,815	2,279,350	2,425,000.00	2,770,100.00	2,760,500.00
Miscellaneous (roads, annuities, etc.).....	40,020.00	31,020.00	31,020.00	42,020	771,020	736,020.00	2,761,020.00	1,019,971.80
Subtotal.....	20,789,606.73	19,065,998.35	17,984,945.67	16,757,064	23,538,132	23,760,290.05	24,922,271.85	25,544,259.43
Construction (general).....	5,570,440.00	1,634,100.00	711,600.00	400,000	981,000	780,900.00	4,231,775.00	4,975,712.00
Roads and bridges.....	670,000.00	1,420,000.00	270,000.00	2,000,000	4,000,000	3,500,000.00	3,000,000.00	3,000,000.00
Total.....	27,030,046.73	22,140,098.35	18,966,545.67	19,157,064	28,519,132	28,041,190.05	32,214,049.85	33,519,962.43

SPECIFIC APPROPRIATIONS FROM TRIBAL FUNDS SUPPLEMENTING TREASURY APPROPRIATIONS

General purposes.....	\$332,913.98	\$126,300.00	\$390,501.00	\$100,000	\$9,153	\$20,000.00	\$159,815.00	\$224,024.21
Industrial assistance.....	180,532.21	45,000.00	188,000.00	55,000	151,000	381,000.00	91,600.00	231,000.00
Irrigation and water development.....	49,500.00	59,000.00	46,950.00	6,720	6,500	7,000.00	5,000.00	205,000.00
Education.....	910,000.00	803,000.00	708,600.00	599,550	389,580	332,820.00	314,995.00	314,995.00
Conservation of health.....	125,000.00	125,000.00	131,550.00	121,490	102,000	80,000.00	788,180.00	3,000.00
Support of Indians.....	1,767,100.00	1,032,380.00	789,100.00	594,155	781,700	768,400.00	105,000.00	859,590.00
Miscellaneous (roads, annuities, etc.).....	50,000.00	25,000.00	25,000.00	-----	-----	105,000.00	105,000.00	11,500.00
Total.....	3,415,046.19	2,215,680.00	2,279,701.00	1,426,915	1,409,933	1,694,220.00	1,464,500.00	1,851,109.21
Grand total.....	30,445,092.92	24,355,778.35	21,246,246.67	20,583,979	30,019,065	29,735,410.05	33,678,639.85	35,371,071.64

OFFICE OF THE SOLICITOR

Nathan R. Margold, *Solicitor*

THE tasks of the immediate staff of the Solicitor have included the representation of the Secretary of the Interior in litigation in the District of Columbia, the drafting of proposed legislation and reports thereon, the preparation of land decisions and departmental opinions and findings, the handling of legal features of Indian reorganization, and the review and other disposition of all other legal matters as are involved in the manifold and varied activities of the Department.

During the fiscal year the Solicitor has represented the Secretary of the Interior in various actions contested in courts of the District of Columbia. Of the four cases in the District Court of the District of Columbia involving an Indian matter, the issuance of oil and gas leases, and the validity of the regulation relating to the practice before the Department by former employees, the Department prevailed in three of the cases. The fourth case was discontinued.

In the same court 28 War Mineral Relief cases were disposed of, 16 by entry of consent decrees and 12 by orders of dismissal. There are 26 remaining of record. Although an attempt is being made to dispose of these remaining cases by agreement, it is expected that the majority will have to be set for hearing.

Two cases were argued in the Court of Appeals for the District of Columbia. In one case, a mandamus suit to compel the issuance of a patent for land, the court sustained the Department on all points. In the other, involving a question relating to the exchange of land, the decision of the lower court, which had sustained the Government's position, was reversed. The decision left open, however, the possibility of consummating the exchange in another manner.

The Solicitor and his staff have also assisted the Department of Justice in the prosecution and defense of actions in other courts. The Solicitor's Office did intensive work in connection with the preparation and trial of the important case brought by the Government against the city and county of San Francisco to enjoin the violation of section 6 of the Raker Act and in advising and conferring with special counsel for the Government in the Elk Hills oil case (*United States v. Standard Oil Co. of California et al.*), wherein the United States sought to be

declared the owner of valuable mineral lands. Decrees in both cases were entered in favor of the United States.

During the year the Solicitor appeared as of counsel in 13 cases which were before the Circuit Court of Appeals for the First Circuit on appeal from the Supreme Court of Puerto Rico and in five cases before the Supreme Court of the United States involving the Government of Puerto Rico or its officials. This litigation work is handled by special counsel for the Government of Puerto Rico under the direction and general supervision of the Solicitor.

A quantitative summary of the work disposed of in the Office of the Solicitor during the fiscal year ending June 30, 1938, is embodied in the following table:

	Land decisions	Opinions of Solicitor	Indian matters	Miscellaneous matters ¹
Pending July 1, 1937.....	348	351	123	122
Received during year.....	598	490	8,340	37,381
Total.....	946	841	8,463	37,503
Disposed of during year.....	776	697	8,334	37,304
Pending June 30, 1938.....	170	144	129	129

¹ "Miscellaneous matters" include such transactions as the following: Contracts for the erection of buildings, road construction, supplies, etc.; reports on legislation; grants, transfers, and cancellations of mineral leases and permits; contracts with irrigation districts; grants and acquisitions of rights of way for power lines and for ditches and canals; withdrawals and restoration of land; determination of power rates.

Disposition was made of 776 land appeals during the year. Land appeals arising under the Taylor Grazing Act are steadily increasing in number and novel questions and problems are being presented for consideration which have added to the task of the lawyers who handle this type of work.

Solicitor's opinions in the total amount of 697 were rendered during the past year as compared with 561 for the preceding year. Of the number rendered, 316 were title opinions and 295 were on damage claims, as compared with the figures 333 and 164, respectively, for the year ending June 30, 1937. Title opinions pending at the termination of the fiscal year 1936-37 totaled 210 whereas only 52 were pending on June 30, 1938. Only 65 damage claims were undisposed of on the latter date.

In addition to these special categories, requests for opinions have covered the usual broad range. The task of resolving new problems arising under old statutes and of construing new statutes which multiply the activities of the various bureaus of the Department with each session of Congress, becomes increasingly greater with the passage of each year. The responsibility which rests upon the legal officers of the Department in directing and safeguarding administrative action is evidenced by the variety and number of questions which are submitted for opinion during the course of a year. The follow-

ing subjects are illustrative of the submissions which were received and acted upon in the past fiscal year:

Authority of the Secretary of the Interior, under section 9 of the Taylor Grazing Act, to accept a contribution consisting of funds received by a State under section 10 of the act, when the contribution is offered to be made to him, pursuant to a law of the State, by a district advisory board which, although appointed by him and functioning under his direction, has been authorized by the State to disburse the funds for certain specified purposes.

Construction of section 1 of the act of June 30, 1936 (49 Stat. 2040), amending section 5 of the War Minerals Relief Act approved March 2, 1919.

Constitutionality of provisions of State law and State constitutions denying the franchise to Indians.

Interpretation of a deed from the Territory of Hawaii to the United States of America purporting to convey Government lands and to reserve to the Territory perpetual grazing rights thereon within the Hawaii National Park and in particular the right of the Hawaiian Agricultural Company to clear national park lands for grazing under the terms of a lease which included an assignment of the right to graze livestock in such area.

Whether manila rope manufactured in the Philippine Islands is dutiable under the customs laws in force and effect for the Virgin Islands; whether such article may be considered a product of American manufacture under the "Buy American" provisions of the act approved March 3, 1933 (47 Stat. 1489); and whether the Virgin Islands Company may pay the amount of the import duty which is due on the article in the event it is dutiable.

The right and power of the Consumers' Counsel of the National Bituminous Coal Commission to appeal from orders of the Commission, to bring judicial proceedings to compel the Commission to furnish information to him and to be represented in both such proceedings by attorneys of his own choice.

Interpretation and administration of the act of September 1, 1937 (Public, No. 411, 75th Cong., 1st sess.), relating to the production and export of helium.

Authority of Secretary of the Interior to repossess or reacquire lands and improvements thereon by certain full-blood Choctaw Indians of Mississippi under contracts made under the authority of section 9 of the act of May 25, 1918 (40 Stat. 561, 573), and similar acts, and to hold the title thereto in trust for such Indians as he may designate under the authority given by section 5 of the act of June 18, 1934 (48 Stat. 984).

Responsibility of State Board for Vocational Education under the Smith-Hughes Act (39 Stat. 929), for employing, discharging, and fixing the tenure of its employees, and for making requisitions on the State custodian for vocational education for the disbursement of Federal funds.

Liability of individual members of the Quapaw Tribe of Indians in Oklahoma for Federal income taxes.

Reports on bills to Congress and to the Bureau of the Budget which originated in or cleared through the Solicitor's Office totaled 623 in number. Drafts of 31 bills sponsored by the Department were prepared or reviewed by the Solicitor's staff. Many of the legislative measures have required extensive research and preparation. A substantial number of bills, either sponsored by or important to the Department, progressed to final passage during the two sessions. The following measures are specially noteworthy:

H. R. 10024, to establish the Olympic National Park in the State of Washington.

H. R. 4852, to provide for the creation of the Saratoga National Historical Park in the State of New York.

H. R. 6652, to provide for the administration and maintenance of the Natchez Trace Parkway in the States of Mississippi, Alabama, and Tennessee.

S. 3689, to govern the leasing of Indian lands for mining purposes.

S. 2163, to authorize the deposit and investment of Indian funds.

H. R. 7874, to provide for the leasing of State, county, and privately owned lands for the purpose of furthering the orderly use, improvement, and development of grazing districts.

S. 3310, to amend section 35 of the Mineral Leasing Act (which was included in the Interior Appropriation Act).

S. 2650, to authorize the completion, maintenance, and operation of the Fort Peck project for navigation, and for other purposes.

H. R. 8008, to provide for the purchase of public lands for home and other sites.

Work in connection with the contracts with the Los Angeles Bureau of Power and Light and the Metropolitan Water District relating to the sale of Boulder Dam energy, which were executed shortly after the close of the fiscal year, required the active participation of the Solicitor in numerous conferences and hearings which were held during the course of the negotiations for the purpose of reconciling the conflicting interests and resolving the many problems that were involved. The major portion of the Solicitor's time and efforts was devoted to the preparation of these two contracts which will result in the accrual of additional revenues and other substantial benefits to the Government.

Various legal problems arising with respect to the exportation of helium under the Helium Act of September 1, 1937, have demanded consideration. Special attention was given to the review of the regulations governing the production and sale of helium and the preparation of amendments thereto.

Legal questions relating to grazing matters have increased the volume of work of the Solicitor's staff. In addition to the preparation of a number of opinions dealing with the Taylor Grazing Act, considerable time was spent on the work of revising the Federal Range Code, a matter of great importance to the Division of Grazing.

Numerous other miscellaneous legal matters arising in connection with the various activities of the Department were reviewed and disposed of during the year by the Solicitor's staff.

The burden of work of the lawyers attached to the General Land Office has increased appreciably due to the new conservational policies that have become effective. Matters relating to the issuance of leases under the Taylor Grazing Act and the new type of homestead work have accounted to some extent for this increase. The new policy affecting the management of revested grant lands inaugurated pursuant to the act of August 28, 1937, has presented novel legal problems for solution. Matters arising under the oil and gas and other mineral leasing laws continue to bulk large in the work of the legal section.

A noteworthy accomplishment was the codification of the regulations of the Land Office. These regulations are now for the first time available for general use in an up-to-date form.

Oil and gas leasing matters, particularly the review and revision of unit plans, continued to require the careful attention of the lawyer assigned to the Geological Survey. For the period preceding the past year, only 47 plans were approved, involving 662,468 acres. During the fiscal year 44 plans involving 591,116 acres were approved, indicating notable progress in this field of work. In addition to the regular legal work the codification of the operating regulations of the Geological Survey was completed.

The numerous regulations and orders governing the activities of the Indian Service were codified during the year by the legal staff of the Indian Office. This work will be of considerable value not only to the Department but also to the Indians. The relationship of the Indians to the new Government agencies created a number of special legal problems during the course of the past year which the Solicitor's Office, with the cooperation of the Federal agencies directly concerned, was able to solve.

The important business of administering the estates of deceased Indians, other than members of the Osage Tribe or of the Five Civilized Tribes, is handled by a staff which is still numerically inadequate. Improved administrative measures, although increasing the work of the probate attorneys, have resulted in large savings to the Indians. All except two of the eight probate divisions are now in an acceptable condition. Additional assistance would improve the situation in those two divisions. The retention of an auditor to check all Osage guardianships has justified expectations. The Indians' rights are now much better protected. During the past year certain unsatisfactory conditions were disclosed in connection with probate matters. It is expected that remedial recommendations which will lead to the improvement of these conditions will result from the careful study that is being made. The need for a revision of the regulations relating to the sale and leasing of Indian lands was revealed by the exhaustive study that was made during the year of Indian land matters. As a result recommendations were made by the Solicitor's Office which are now being examined by the administrative authorities.

Conferences with parties interested in the various Indian irrigation projects, with officials of the Irrigation Service and with United States attorneys and representatives of the Department of Justice in connection with pending litigation and the preparation of suits to be instituted affecting the various projects, have caused an increased demand on the time of the legal staff attached to that Service. The lawyers of the Service actively participated in a number of cases of importance in connection with irrigation projects. Of chief interest is the case of *United States v. Powers et al.* which was decided adversely

to the Government on appeal. In cooperation with the Department of Justice, counsel attached to the Service did considerable work preparatory to the filing of a petition for certiorari in the Supreme Court. The ultimate decision will affect practically every Indian irrigation project in the country.

The legal work relating to Indian organization has involved primarily the task of assisting the Indian tribes in carrying out the powers vested in them by the Indian Reorganization Act and the Oklahoma and Alaska amendments, although questions requiring interpretation of the acts continue to demand consideration. Assistance in the drafting of organization regulations and legal documents needed in carrying out their programs was rendered to the Indian tribes. The Solicitor's Office contributed to the development of a procedure intended to insure a better understanding of and participation in the functioning of credit associations by the Indians. Several hundred ordinances and resolutions passed under constitutions and charters which have been adopted were reviewed and in addition 16 constitutions and 24 charters were approved. Due to the analysis of basic legal questions, notable progress was made with respect to the establishment of a functioning organization in Alaska.

The work of the Bureau of Reclamation has continued to require extensive legal services in Washington and the field. Lawyers in the Washington office approved 219 construction and supply contracts involving an aggregate expenditure of \$97,644,413.32, as compared with 147 contracts involving \$22,553,571.99 for the preceding year. The task of drafting the complicated contracts in connection with the Central Valley project and the repayment contract to be entered into with the Northern Colorado Water Conservancy District, involving large sums of money required intensive work on the part of lawyers of the bureaus and the special attention of the Solicitor.

In addition to their regular work counsel for the Bureau have devoted a considerable amount of time to litigation. A number of condemnation cases have been instituted in connection with the various reclamation projects requiring the preparation and examination of pleadings. Counsel actively participated in the trial of the important case of *United States v. Tilley* which was instituted as a result of the construction placed by the Department on the Warren Act contracts. A member of the Solicitor's staff was present at the trial of this case because of its significance in relation to the case of *Nebraska v. Wyoming*. In the latter case the motion to intervene filed by the United States was granted and it is expected that two attorneys responsible to the Solicitor will be required to spend a substantial portion of their time on this case alone for some time in the future because of its relation to projects on the North Platte River and the fact that basic principles of water law are involved.

WAR MINERALS RELIEF COMMISSION

Arthur J. Barber, *Acting Commissioner*

I. UNDER THE ACT OF FEBRUARY 13, 1929 (45 STAT. 1166)

IN THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT
OF COLUMBIA

Within the period under review the court dismissed 17 cases and entered 14 decrees. The status of cases filed under the act of February 13, 1929, is:

Total petitions filed.....			348
Total cases dismissed by the court.....			91
Decisions by the Secretary of the Interior under decrees:			
	<i>Awards</i>	<i>Denials</i>	
To June 30, 1937.....	167	24	
July 1, 1937, to June 30, 1938.....	12	2	
			205
Cases pending in court.....			30
Decrees entered and pending in the Commission.....			22
			348

Under authority of decrees from the court the Secretary of the Interior made 12 awards totalling \$120,203.18, and 2 denials.

An appropriation was made in the Second Deficiency Appropriation Act, Public, No. 723, Seventy-fifth Congress, approved June 25, 1938, to pay four awards totaling \$15,126.26. Eight awards totaling \$105,076.92 were certified and are pending a future deficiency appropriation.

The Commission has further recommended one denial.

UNDER THE ACTS OF MAY 18, 1936 (49 STAT. 1355) AND JUNE 30, 1936 (49 STAT. 2040)

Under these acts, 335 applications for review were filed with the Secretary of the Interior before December 31, 1936. Since that date the number of eligible applications has fluctuated by reason of changes of status and by reason of dismissals or by decrees which authorize a review of the item of interest, coming from the Court under the act of February 13, 1929, and by reason of late filings under the act of May 18, 1936, which may be accepted at any time since no limit for filing was provided in that act.

	<i>Application</i>
Accepted for review under act of May 18, 1936.....	80
Accepted for review under act of June 30, 1936.....	153
Acceptance pending authority to file claim.....	11
Dismissed by court.....	21
Pending in court.....	25
Rejected as ineligible under either act.....	48
Total as of June 30, 1938.....	338

II. UNDER THE ACT OF MAY 18, 1936 (49 STAT. 1355)

This act provides that when the decree of court has authorized a review of the loss of interest to March 2, 1919, the Secretary of the Interior shall reconsider interest to the date of passage of the act.

The act fixes a limitation of \$1,250,000 to be awarded under this amendment. An initial appropriation of \$500,000 (49 Stat. 1619, June 22, 1936) has been disbursed, and an additional appropriation of \$650,000 was made (50 Stat. 221, May 28, 1937).

Within the period under review, the Secretary of the Interior made 25 awards totalling \$378,258.63, and denied 4 claims.

In the previous fiscal year \$740,412.11 was awarded and has been paid. In the fiscal year under review 13 awards totalling \$361,607.44 have been paid; and 12 awards totalling \$16,651.19 have been made and certified, but are not yet paid.

The unexpended balance of appropriation on June 30, 1938 is \$47,980.45, which, by terms of the Appropriation Act of May 28, 1937 (50 Stat. 221) would revert to the Treasury as of July 1, 1938. Including the above sum, the balance of unexpended authorization is \$147,980.45.

Under this Act of May 18, 1936, the Secretary of the Interior has considered 32 claims. Forty-eight claims are pending in the Commission; but this number is subject to a further fluctuation.

III. UNDER ACT OF JUNE 30, 1936 (49 STAT. 2040)

This act authorized claimants who failed to file suit under the act of February 13, 1929, or whose suit so filed abated, to petition the Secretary of the Interior to review their claims on matters of law in the light of decisions of the court in similar cases, and to make awards; and provided for the rights of deceased claimants to descend to their legal successors; and provided for the rights of dissolved corporations to descend to any officer, director, stockholder or legal representative who shall be entitled to the benefits of this act; provided, that such claims be filed within 6 months of approval of this act.

Under this act, 231 applications for review were filed within the limitations of the act and prior to December 31, 1936. The status of these applications is as follows:

Accepted for review.....	153
Pending authority to file claim.....	11
Suits abated; grounds for reopening not established.....	21
In court under act of Feb. 13, 1929, pending decision as to the right to petition for a review under the act of June 30, 1936.....	25
Rejected as ineligible.....	21

The Congress appropriated \$100,000 (50 Stat. 221, May 28, 1937) for immediate payment of claims. There is no authorization to limit the amount which may be paid under this act.

In the previous fiscal year \$45,383.84 was awarded and paid.

In the fiscal year under review, the Secretary of the Interior made 12 awards totalling \$44,100.76, which have been paid; and made 15 awards totalling \$38,817.24 which have been certified but remain unpaid; and denied 15 claims.

The unexpended balance of the appropriation is \$10,515.40, which, under the terms of the Appropriation Act of May 28, 1937 (50 Stat. 221), would revert to the Treasury on July 1, 1938.

Under this act of June 30, 1936, the Secretary of the Interior has considered 47 claims of the 153 claims accepted for review as of June 30, 1938; he has made 32 awards totalling \$128,301.84, and 15 denials. There are 106 applications accepted and pending in the Commission; but this number is subject to a further fluctuation.

SUMMARY

Decisions by the Secretary of the Interior

	<i>Awards</i>	<i>Denials</i>	<i>Total</i>
Act of February 13, 1929.....	179	26	205
Act of May 18, 1936.....	28	4	32
Act of June 30, 1936.....	32	15	47
Total decisions to June 30, 1938.....	239	45	284

Pending Before the Secretary of the Interior

Recommendation by the Commission; 1 denial.....	1
Under act of February 13, 1929:	
Cases pending in Court.....	30
Decrees pending in Commission.....	22
	52
Under act of May 18, 1936.....	48
Under act of June 30, 1936.....	141
Total claims pending examination and decision by the Secretary of the Interior, as of June 30, 1938.....	242

DIVISION OF TERRITORIES AND ISLAND POSSESSIONS

Ernest Gruening, Director

THE Division of Territories and Island Possessions has continued its administrative functions of coordinating and supervising the activities under its jurisdiction, which include the Governments of Alaska, Hawaii, Puerto Rico, and the Virgin Islands; also the Alaska Railroad, the Alaska Road Commission, Alaska insane, the Consolidated Purchasing and Shipping Office in Seattle, the Virgin Islands Company, and the colonization projects on Jarvis, Baker, Howland, Canton, and Enderbury Islands.

The Director made an extensive trip to the South Seas in the fall of 1937, in the course of which he inspected Kingman's Reef, use of which as a station in commercial plane flights to the Antipodes had been projected, and the Phoenix Islands, including Canton, Enderbury, Hull, Phoenix, and Sydney. An Executive order proclaiming sovereignty of the United States over Canton and Enderbury Islands and placing them under the supervision of the Interior Department was issued on March 3, 1938. At approximately the same time, colonists from Hawaii were landed on these two islands, the American flag raised, the construction of living quarters and lighthouses begun, and radio facilities established. Preparation of the lagoon on Canton Island for the use of commercial planes has proceeded rapidly since that time. A visit to the Samoan Islands was included in this itinerary.

The Director later left for an extended visit in the Territory of Alaska for the purpose of making a comprehensive survey of the Matanuska Valley colonization project and to discuss matters relating to the Alaska Railroad, Alaska Road Commission, and other activities, with the various officials concerned.

TERRITORY OF ALASKA

During the fiscal year 1938 the administrative functions of the Department in connection with the Office of the Governor of Alaska, the Alaska Railroad, the Alaska Road Commission, and the care of the legally adjudged insane of Alaska, were performed through the Division of Territories and Island Possessions. The Seattle Consolidated

Purchasing and Shipping Office was placed under the administrative supervision of the Division effective June 1, 1938. The Division cooperated with the several branches of the Interior Department and the other departments and agencies of the Government having activities in Alaska, in determining matters of policy with reference to the Territory. These activities took the form of consultation and aid in legislative and budget matters, in aiding in the coordination of Federal efforts for the development of the Territory, notably in detailing personnel and supplying information to the National Resources Committee in connection with the report, Alaska—Its Resources and Development, prepared at the request of the President pursuant to Concurrent Resolution 24 passed August 21, 1937.

During the fiscal year 1938 the Alaska Railroad operated a modern transportation service the year round between Seward and Fairbanks, a distance of 470.3 miles; also on branch lines totaling 30.5 miles into the Matanuska and Nenana coal fields. The summer passenger-train schedule placed in effect during June 1937 provided for three round trips a week between Seward and Fairbanks with supplementary service out of Fairbanks to Nenana and McKinley Park and out of Seward to Anchorage and Palmer. Passenger train service was reduced to two round trips each week on September 7, and was further reduced to the winter schedule of one round trip each week on September 20. Mixed train service was operated between Anchorage and Matanuska points on the Matanuska branch line one or two trips each week, depending upon the volume of traffic. Freight train service varied from one round trip to two round trips each week between Seward and Fairbanks, governed by the volume of freight and the steamer arrivals at Seward. River boat service was maintained during the season of navigation with sailings from Nenana to Tanana, Ruby, Holy Cross, and Marshall every 2 weeks.

Rail line passengers numbered 26,026; rail line passenger-miles, 4,247,677; rail line freight, 155,833 tons, of which 106,636 tons were coal. Operating revenues amounted to \$2,212,844.65 and nonoperating income totaled \$1,603.60. Operating expenses were \$2,142,617.97. With collections from the operation of ocean-going vessels amounting to \$4,873.41, the total income in excess of expenses was \$76,703.69. At the beginning of the fiscal year, there remained an unobligated balance of \$543,211 from a Public Works Administration allotment of \$737,000 made in May of 1937. On June 30, 1938, there still remained an unobligated balance in this allotment of \$124,883.92. This allotment is being used for needed rehabilitation and improvement work on the Alaska Railroad—the construction of a bridge across Knik River, a tourist hotel at Mount McKinley Park entrance, ballasting, line changes, and other items of improvement and rehabilitation. In May 1938, \$210,400 was provided by the Works Progress Administra-

ion for the employment of relief labor in ballasting and surfacing the rack and to replace deteriorated ties. The greater part of this allotment remains for expenditure for the fiscal year 1939, but on the last day of June 1938, 332 persons were employed on these projects.

The Alaska Road Commission is charged with the construction and maintenance of roads, bridges, and trails in Alaska outside national forests. The construction and maintenance of airfields, telephone lines, and shelter cabins is also undertaken for the Territory. Funds are made available by Congressional appropriation, from the Alaska fund and from contributions by the Territory and others. In addition, during 1938, \$388,386 from a Works Progress Administration allotment was available for expenditure. The total expenditure from all sources by the Commission during the year was \$1,376,792.31. The work accomplished during the fiscal year may be summarized as follows:

New construction:

56¾ miles of road of which 16½ were surfaced.

54 miles of sled road and a number of bridges.

Improvement:

74¼ miles of road regraded and widened.

127½ miles of road surfaced and 871 metal culverts installed.

Maintenance:

1,915 miles of road.

80¼ miles of tramway.

557 miles of sled road.

2,061½ miles of permanent trail.

304 miles of temporary flagged trail.

The legally-adjudged insane of Alaska are cared for under contract negotiated by the Secretary of the Interior. Under provisions of law, the Sanitarium Co. of Portland, Oreg., has provided care and treatment for a number of years. The present contract became effective January 15, 1938, for a period of 5 years, at the rate of \$648 per patient per annum. The Department continues to be represented at the hospital by a psychiatric supervisor. At the beginning of the fiscal year 296 patients were receiving treatment. During the year 73 patients were admitted, while those deceased, discharged or transferred, numbered 57, leaving 312 persons in the institution on June 30, 1938.

TERRITORY OF HAWAII

Commerce of Hawaii, now approaching a total of \$250,000,000 annually, showed an increase for the calendar year of 1937, of \$26,-433,227 over the value of the commerce in the previous calendar year. The Territory had a favorable trade balance of \$18,406,603, the total exports being valued at \$132,239,807, while the value of imports was \$113,833,204. By far the largest share of this commerce was between the United States and the Territory.

The pineapple industry is making long strides in overtaking the sugar industry as the primary commercial endeavor of the Territory. The value of the shipments of canned pineapple and pineapple juice increased by approximately \$4,000,000 each, while the value of sugar exports decreased by approximately the same amount.

The Territorial unemployment compensation law now in effect has three primary objectives. First, it provides for the accumulation of reserves during periods of expanding employment which may be used for the payment of benefits to persons who may subsequently become unemployed through no fault of their own. A second objective is the stabilization of employment and in the third place, the unemployment compensation law provides for the maintenance of free public employment offices to assist workers in obtaining suitable jobs, and to assist employers in obtaining suitable workers.

Special efforts were made in renewing cane land leases to the end that the Territory share in the profits derived from the leased areas. Two of the more important of such leases, covering large areas of land, completed during the year, include the lease of Hilo Sugar Co. of 2,265.656 acres of the land of Piihonua, Hawaii, and one to the Kekaha Sugar Co. covering 29,698 acres at Waimea, Kauai.

Collections by the Commissioner of Public Lands from all sources during the year showed an increase of \$63,605 over the preceding year. Due to the sugar quota, several lessees of caneland have discontinued the use of such land for cultivation and are using the same for pasturage purposes.

The amount of sugar which may be produced in 1938 in the Territory under the 1937 Sugar Act is approximately 1,135,000 tons raw value. Of this amount, approximately 951,000 tons may be shipped to the mainland and 30,000 tons may be sold locally. The difference between the amount which may be produced and the amount which may be marketed provides a reserve. Benefit payments to the Hawaiian sugar growers and other farmers in the Territory during the year amounted to approximately \$4,900,000 through the Agricultural Adjustment Administration and Soil Conservation and Domestic Allotment Act.

Upon hearing of new possibilities for low-rent housing and slum clearance in the Territory, the housing authority appointed by the Governor began intensive work to have funds earmarked for Hawaii. On April 11, 1938, there was set aside for Hawaii \$2,400,000.

One of the discordant notes which occurred in the administration of the islands during the year was the strike of interisland seamen and drydock workers which commenced late in May 1938, and crippled transportation between the islands for nearly 3 months. Regular service was resumed early in August when men in most of the departments returned to work.

Funds made available by the Public Works Administration and the Works Progress Administration provided for construction of roads and highways, buildings, parks, public utilities, and flood control in the islands during the fiscal year. Besides the construction work, a number of statistical, research, and educational projects also were carried on, providing work for clerical and other employees.

HAWAIIAN HOMES COMMISSION

The Hawaiian Homes Commission was created by the Hawaiian Homes Commission Act—1920, to rehabilitate Hawaiians by placing selected families on Government lands set aside for this purpose in the nature of 99-year leases of farm, pastoral, and residence lots and with long-term loans at low rates of interest.

Approximately 3,800 Hawaiians included in 650 families are now occupying farms and lots on the Islands of Oahu, Molokai, and Hawaii. To the 203 families on Molokai, \$262,047.62 was paid for the produce raised on their farms, consisting of corn, potatoes, pineapples, and other food crops.

On Hawaii, \$80,000 is being expended for an addition of about 175 lots to the existing 231 residence lots located at Keaukaha, a suburb of the city of Hilo, on the Island of Hawaii. In addition to these lots, two community buildings to be used for social, educational, recreational, and general welfare work among the Hawaiians, have also been constructed as part of this project.

PUERTO RICO

The finances of the insular Government are in excellent condition. Total receipts for the year aggregated \$43,298,448, while the expenditures amounted to \$41,666,329, leaving an excess of receipts over expenditures of \$1,632,119. Imports were valued at \$93,314,783, of which \$84,987,994 came from the continental United States. Exports were valued at \$82,052,341, of which \$79,808,113 were shipped to the continental United States.

Various laws recommended by the Department were enacted by the Seventy-fifth Congress: (1) Authorizing the legislature of Puerto Rico to create public corporate authorities to undertake slum clearance and provide dwelling accommodations for families of low income; (2) ratification of all joint resolutions enacted by the legislature of Puerto Rico and the former legislative assembly; (3) authorizing the Governor of Puerto Rico to fill vacancies in the legislature of Puerto Rico caused by death, resignation, or otherwise, of senators and representatives, until the necessary general election; (4) exemption of persons traveling between Puerto Rico and the continental United States from payment of a stamp tax on steamship tickets; (5) to

correct the citizenship status of certain persons who were born in Puerto Rico; (6) extension of provisions of section 21 of the Bankhead Jones Act to Puerto Rico providing for the development of cooperative agricultural extension work; (7) to transfer certain parcels of land including the Escambron tract to the people of Puerto Rico. Strenuous efforts were made to have certain provisions of the Social Security Act extended to Puerto Rico, but without success.

Since the creation of the Institute of Tourism of Puerto Rico, an extensive campaign has been undertaken to bring to the attention of tourists the natural beauties and attractions of Puerto Rico, its historic forts and other places of historical interest. The government of Puerto Rico recently sponsored a cruise for Government employees to the island. More than 400 persons took advantage of the opportunity, sailing on the steamship *Iroquois*, spending 3 days and 2 nights in Puerto Rico and 1 day in St. Thomas, Virgin Islands. Approximately 18,000 visitors were entertained during the first 5 months of 1938, as compared with 7,000 visitors for the same period last year.

A loan of \$972,000 and a grant of \$795,273, or a total of \$1,767,273, has been authorized for the construction of a graving dock at San Juan. Plans and specifications are now being prepared and work on the project will start early next fall.

THE VIRGIN ISLANDS

The program of economic rehabilitation which has been carried on for a number of years in the Island of St. Croix was seriously endangered by a prolonged and severe drought. The sugar business, which is the basic industry of that island, suffered a severe setback. The benefits of increased sugar quotas under the Sugar Act of 1937 for the Virgin Islands were lost as a result of the drought. Sugar production fell off approximately 50 percent in tonnage and approximately 60 percent in value due to low prices.

The homesteading program, which depends for the most part on sugarcane production as a cash crop, was seriously affected by the drought, 298 homesteaders in the island of St. Croix receiving for the year 1938 a gross return which was only 29 percent of their 1937 income.

On the other hand, continued improvement was shown in St. Thomas, where the shipping business is the important industry. A total of 814 ships, with total tonnage of 3,239,975 tons, called at the port of St. Thomas during the fiscal year. Transshipment was inaugurated for a trial period at the port of St. Thomas of bauxite originating in British Guiana and destined for Canada. This use of an American port by foreign interests signalizes the advantages of the port of St. Thomas over competing ports in the Caribbean area.

The Army Engineer Corps has continued its engineering surveys of the harbor of St. Thomas with a view to beginning authorized harbor improvement work in the new fiscal year.

Development of the tourist trade and winter resident trade continues to make gradual progress. The Bluebeard Castle Hotel was turned over to a private operator under a mutually satisfactory lease, after advertisement for bids, on December 1, 1937. The period of Government operation of this hotel while under construction, during which costs were paid from income of the hotel, ended on November 30 with a slight profit which has been deposited in the United States Treasury.

The cattle business, which is of second importance in the Virgin Islands, was seriously endangered by the imposition of restrictions against shipments to Puerto Rico, which is the important market for that industry. A careful study of the cattle business was made by an expert whose numerous recommendations are being studied with a view to expanding the cattle business and establishing it on a firm and economic basis.

Work-relief allocations were made which permitted the continuation of a road-improvement program which has been of substantial benefit to the islands. Great progress has been made in improving the sanitary condition of the towns in the Virgin Islands, through the extension of sewer and salt-water flushing systems in Charlotte Amalie and through the surfacing of streets and improvements of street drains in all the towns in the Virgin Islands.

The management of three urban housing projects constructed by the P. W. A. Housing Division was transferred to the government of the Virgin Islands on September 1, 1937. These housing units are now more than 80 percent occupied and will soon be completely occupied.

Plans are now in preparation by the Procurement Division of the Treasury Department for the major repair and reconstruction of numerous historically and architecturally interesting Federal buildings which were transferred to the United States Government by the Danish Government at the time of the purchase of the Virgin Islands. Reconstruction work will be undertaken in the new fiscal year.

Studies conducted by the Department of Labor, the Department of State, and the Department of the Interior with respect to the enforcement of the United States immigration laws in the Virgin Islands have led to the administrative reorganization and improvement in the methods and means of enforcement.

THE VIRGIN ISLANDS CO.

During the fiscal year the Company cultivated 3,000 acres of sugarcane, manufactured 2,300 tons of raw sugar and about 100,000 gallons of rum. It sold during the year 40,000 cases of Government House

rum, employed about 900 persons, and paid about \$40,000 in taxes to the local government.

A severe and prolonged drought caused great damage and loss to the sugarcane crop. Many fields were lost and the crop for the year 1939 will be even less than that for 1938. Plans are under way for drilling deep wells to provide against droughts in the future.

The company furnished a market for the cane grown by 700 homesteaders. During the year the Angostura-Wuppermann Corporation began the manufacture of Angostura Bitters in the Virgin Islands, and the Virgin Islands Co. is furnishing one of the ingredients for the bitters.

EQUATORIAL AND SOUTH SEA ISLANDS

Four cruises were made from Honolulu, T. H., to Jarvis, Baker, and Howland Islands, during the year, under the supervision of the field representative of the Department of the Interior, carrying water, food, and other supplies for the maintenance of the colonists stationed there. Early in 1938 the Division also took over the administration of the islands of Canton and Enderbury, acting under Executive order of March 3, 1938, and established colonies on these two islands, similar to the ones on the other equatorial islands. High-powered radio equipment was set up on Jarvis and Canton Islands, for the purpose of reporting weather information daily to the United States Weather Bureau station in Honolulu.



UPPER: A SEMIURBAN LOW-COST HOUSING DEVELOPMENT IN PUERTO RICO.
 LOWER: A CEMENT PLANT CONSTRUCTED BY THE PUERTO RICO RECONSTRUCTION
 ADMINISTRATION.

PUERTO RICO RECONSTRUCTION

ADMINISTRATION

Miles H. Fairbank, *Assistant Administrator*

ESTABLISHED by Presidential order dated May 28, 1935, under the authority of the Emergency Relief Appropriation Act of 1935, the Puerto Rico Reconstruction Administration has operated in the Island of Puerto Rico since September 1935. Charged with the responsibility of expending the emergency funds assigned to it for the relief of the unemployed in the island it is carrying out a comprehensive program of economic and social rehabilitation tending to correct the unwholesome social and economic trends from which this insular possession has suffered acutely.

The fundamental economic problem in Puerto Rico arises from the fact that while the island is essentially agricultural, having little or no industry, its important crops—sugar, coffee, and tobacco—because of existing legislation or lack of markets, will not support the dense population. In an island where every square foot of land should be intensely cultivated, thousands of acres are either idle or inadequately used.

The year has seen considerable progress along the many fronts on which the Puerto Rico Reconstruction Administration is operating. About 2,000 agricultural workers and their families have been established in subsistence farms on which modest priced houses have been constructed, and a definite trend has been started toward the growing of subsistence crops, as well as a new type of agriculture, providing other sources of income to supplement sugar, coffee, and tobacco. The P. R. A. Service Farms throughout the island have been producing swine, goats, and chickens for distribution in an effort to achieve a more balanced agriculture. The marketing of new crops through the establishment of packing houses, grading centers, and market research, as well as the establishment of new cooperatives and the encouragement of those already organized, has formed an important part of the program.

Realizing that the success of this type of program depends on the ability to develop leadership and local responsibility, P. R. A. has aided the development of the educational system of the island this year by continuing to build more schools, both primary and second

unit, as well as completing the building program started 2 years ago at the University of Puerto Rico.

The social service program of the P. R. R. A. has expanded rapidly and is having a decided effect upon the successful operation of the program as a whole. Much employment has been given in the construction of needed public works for the various municipalities throughout the island, as well as the insular and Federal Governments. The program for the development of the hydroelectric resources of the island has continued throughout the year, along with the program for soil conservation, cattle tick eradication, hurricane static research and similar projects indirectly but vitally affecting the entire program. There were 24,095 persons employed on P. R. R. A. works on June 30, 1938.

During the year Ernest Gruening, Director of the Division of Territories and Island Possessions, who had also served as Administrator of the P. R. R. A. since its inception, resigned the latter post and the Honorable Harold L. Ickes, Secretary of the Interior, was appointed Administrator by the President. The main office was then transferred to San Juan, all division heads being placed under the immediate supervision of the Assistant Administrator. Considerable reduction of personnel was effected in the Washington office, which has become a liaison and contact office of the Administration. These changes and the subsequent reorganization and consolidation of various functions have resulted in reducing the average cost of administration from approximately \$140,000 per month to an average of \$65,000 without curtailing the effectiveness of the program.

RURAL REHABILITATION

For the general rural rehabilitation of Puerto Rico and in carrying out its own agricultural program the P. R. R. A. has expended to date the total sum of \$19,389,692. These funds have been used for the employment of agricultural workers and the purchase of agricultural implements, fertilizers, spraying materials, and selected seeds, thereby supplying newly created farmers with facilities to carry out the approved agricultural projects. Large tracts of uncultivated or poorly cultivated lands owned principally by absentees have been purchased and subdivided into small farms. The lands acquired to date include the American Suppliers property, formerly a 4,000 acre farm and now subdivided into about 500 small farms; Castaner and Llinas' farms, totaling 1,692 acres, formerly devoted exclusively to coffee growing as the cash crop and now divided into 200 small farms devoted to the cultivation of diversified crops as an example of a new type of agriculture for the coffee region; Zalduondo, originally a farm of 1,500 acres and now subdivided into more than 200 farms from

1 to 20 acres, and St. Just, a farm of 433 acres and now subdivided into 260 small farms. This latter project, close to San Juan, is an interesting experiment in slum clearance through semiurban development.

Land subdivision has been carried on in the Lafayette district. Five thousand acres under cane cultivation purchased by the P. R. R. A. from Sucrs. de C. & J. Fantauzzi have been subdivided into 12 land cooperatives with an approximate average of 400 cuerdas each. Of the 5,000 additional acres of marginal lands also purchased from Sucrs. de C. & J. Fantauzzi, part has been assigned by the P. R. R. A. for resettlement purposes. At the present time 405 1-acre parcels have been segregated and low-cost concrete houses built thereon to be occupied by Lafayette resettlers, who in turn are members of the land cooperatives.

In Vieques, 146 small farms have been created.

Del Rio Plantation, a zone of arid land, is being converted into a productive region by P. R. R. A. technical experts and has been subdivided into 57 small farms. It is being used as a demonstration project for the better utilization of the arid regions of the island.

Subdivision is being carried on also at Farm Marini, recently purchased near Mayaguez. Eighty-nine families will soon be established on an equal number of small tracts there. This also is a semiurban development like St. Just, designed to provide facilities for subsistence to workers with part-time employment.

To this must be added the land acquired from farmers of the coffee, tobacco, and fruit regions, to whom assistance was extended, supplying them part-time labor, fertilizers, and other aid in exchange for which the cooperating farmers agreed to sell to P. R. R. A. land at one-half its appraised value. In those regions the P. R. R. A. has established approximately 2,700 new homesteaders on small tracts of land of from two to three acres each.

Thus more than 40,000 acres located in different parts of the island are being utilized directly in the rural rehabilitation program of the P. R. R. A. In connection with the rural housing program, which is aimed at substituting for the typical fragile old shack of the Puerto Rican peasant decent facilities for comfortable living, 2,080 houses of concrete, treated lumber and rammed earth have been constructed.

In each one of the rural resettlement projects there is a central service farm in charge of a farm superintendent, who gives technical advice to the resettlers and who is responsible for all administrative matters.

The modern poultry plant established at La Plata's central service farm is now distributing weekly an average of 500 chickens among homesteaders. Surplus eggs and chicks are auctioned to the public for use in improving the breeding of poultry throughout the island.

Swine and goats are also distributed by the central service farms among the homesteaders. The P. R. R. A. imported 150 pedigreed Anglo-Nubian goats and 60 pure-bred Duroc Jersey swine for breeding purposes. A number of the boars and bucks has been loaned to the Insular Extension Service for stud in different parts of the island. The value of the P. R. R. A. activity in this direction is shown by the fact that during the past year two private poultry plants selling baby chicks and breeding stock to farmers have been established in the island.

One of the most important activities carried on by the P. R. R. A. for the development of the island's livestock, is the eradication of the fever-producing cattle tick. This program is conducted in cooperation with the Bureau of Animal Husbandry of the United States Department of Agriculture and the Insular Department of Agriculture and Commerce. Work has been completed in the western zone where there are 315 dipping vats operating. One hundred and fifteen thousand eight hundred and sixty-three cattle, 18,776 horses and mules, and 79,688 goats and sheep were treated last year. In the central zone, where vat construction was carried on during the year, there are 282 vats completed and dipping will begin shortly. Construction of vats has been started in the eastern and final zone. Authorities agree that as soon as the eastern zone is covered, the island will be totally free from fever tick.

The soil of Puerto Rico constitutes its basic wealth. In cooperation with the United States Department of Agriculture, the P. R. R. A. has carried on an intensive program of soil conservation. At the Mayaguez, American Suppliers, and Zalduondo projects, terracing and other approved methods of soil conservation constitute an important phase of the rural rehabilitation activities. Not only are thousands of acres in process of being restored to profitable productivity but farmers, especially P. R. R. A. resettlers, are being trained and educated in the application of these new methods for the conservation and correct land utilization of their farms.

Among the activities of the agricultural development projects conducted by the P. R. R. A., the cultivation of vanilla has rapidly increased and will continue. A pilot plant to cure the vanilla beans will soon be completed at Castaner farm. It is expected that by 1942, Puerto Rico will be in a position to enter into a strong competition in the mainland markets with foreign countries now producing vanilla oils. A part of the agricultural program centers around the production of perfumes from tropical plants and trees planted in the island. These projects will within a few years establish new sources of income for Puerto Rican farmers, thereby relieving the island from depending almost exclusively on the present uncertain coffee and tobacco crops to sustain the mountainous regions.

HEALTH, SOCIAL, AND RECREATIONAL ACTIVITIES

The health division of the P. R. R. A. was eliminated on August 10, 1938, that part of its activities relating to medical care being transferred to the insular government and the social service activities transferred to the rural rehabilitation division. As of July 30, 1938, there were operating 21 rural medical centers, comprising 64 rural medical dispensaries. In the urban zone 22 public health units were constructed for the insular government in different municipalities.

In transferring the medical work to the insular government, the P. R. R. A. turned over its buildings, equipment, and trained personnel.

Aside from the contributions to the insular government's health program through the construction of health units and the transfer of its functioning rural health service, the P. R. R. A. constructed a two-story modern sanatorium in Rio Piedras. Important works are being carried on at the School of Tropical Medicine for repairs and enlargement.

Stress was laid upon the prevention and eventual eradication of malaria and of hookworm and other diseases due to intestinal parasites. Preventive work in the rural areas against typhoid fever and smallpox has been carried out on a large scale. The nutritional service was continued and strengthened in an effort to convey to the country people correct ideas on nutrition and infant feeding, enabling them better to utilize their home produce.

The health activities of the P. R. R. A. to date cover 22,060 physical examinations, 27,792 treatments for malaria, 91,550 treatments for intestinal parasites, 97,411 typhoid fever inoculations, 26,021 smallpox vaccinations, and 212,622 laboratory examinations. Of dental services, there have been carried out 48,499 oral examinations, 169,330 extractions, 10,513 prophylactic treatments, and 3,627 miscellaneous treatments. There were 23,180 clinics held and 510,435 patients attended them. Aside from the above-mentioned activities the health division rendered a very useful service through its sanitary engineering section, which was in charge of selecting of sites for the construction of rural resettlement houses and supervising the sanitary regulations to be observed.

As a part of the general work undertaken for the economic and physical reconstruction of Puerto Rico, the social-service program, previously conducted as a section of the health division and now functioning under the rural rehabilitation division, has played an important role. Social workers have been assigned to each rural medical dispensary, community center, resettlement project, and urban housing project. Community centers—some newly constructed, others made over from dismantled workers' camps or abandoned buildings—serve as activity centers for this important work.

Social work has fostered education, outdoor and indoor sports, music, drama, and other activities. Canning centers, instruction in needlework and handcraft form a part of the program of the social workers.

The encouraging of organized sports has been the most important aspect of the recreational activities carried on by the P. R. R. A., in a determined effort to foster the spirit of fair play and cooperation among the people of Puerto Rico. One hundred and thirty recreational centers have been established and were operated last year throughout the Island for the benefit of children outside of school. Organized sports and athletics have been carried on in places where they were unknown before the P. R. R. A.

SUGAR PROGRAM

Sugar is the backbone of Puerto Rico's economic life. Yet with production limited by quotas and current low prices, the industry has not been able to give its maximum employment or carry its share of the island's social problem. To point the way as to how this might be accomplished is the purpose of the P. R. R. A.'s sugar program, which is centered at Central Lafayette.

Central Lafayette—Puerto Rico's first sugar enterprise to be operated through cooperative organization—had last year the fourth largest crop in the Central's history. The yield of cane in sugar was the highest the factory ever had. Wages paid were 10 percent higher than in 1937. As a result of efficient management, and despite several unfavorable factors, total costs remained low while labor performance went up.

A total of 273,382 bags of sugar of 250 pounds each was manufactured from a crop of 266,994.53 tons of cane ground. The crop yielded 12.89 percent of sugar for every hundred pounds of cane, as against 12.65 percent for 1937. This placed Central Lafayette in first place in the island in sugar extraction and represents the efficiency with which the enterprise is being operated.

In the Lafayette district, the P. R. R. A. carried out an extensive resettlement program among the workers who will become members of the several land cooperatives. Four hundred and five concrete houses and ninety-three wooden batey houses have been constructed. A modern two-story hospital, built for the town of Arroyo but to be operated by Central Lafayette, will soon be functioning. Three community centers and three vocational second unit schools have been erected and are functioning.

Four new land cooperatives have been added to the original eight organized among the agricultural workers of Lafayette. A program to drain extensive swamp areas that now constitute a constant malaria menace is under way.

The sugar program is steadily progressing towards three definite goals: (a) To point the way towards a better distribution of profits among the laborers; (b) to eliminate exploitation of colonos; and (c) to prove that improved housing, health, and social service can be achieved without jeopardizing the profitability of the sugar industry.

The seriousness of the sugar situation, however, is more readily recognized when it is revealed that over 100,000 acres of good cane land, capable of employing over 25,000 laborers, is now lying idle in Puerto Rico as a result of the marketing quotas. In an effort to find a way out of this dilemma, the P. R. R. A. has given considerable thought to the development of byproducts that can be made from sugarcane. A first constructive step in that direction was the administration loan to the Asociacion Azucarera Cooperativa Lafayette, the so-called mill cooperative, to build a plant at Lafayette for the manufacture of solvents, principally butyl alcohol and acetone from molasses. The distillery, having a capacity of 5,000,000 pounds of solvents annually, is under construction and will be in operation by January 1, 1939.

The cooperative division of the P. R. R. A. has steadily functioned to assist existing cooperatives and to develop new organizations where opportunities presented.

For the promotion and financing of certain types of cooperatives, the P. R. R. A. has given guidance to the Puerto Rico Self-Help Corporation, an Insular agency, which in turn organized and is supervising the Cooperative Handcrafts, Inc. of Puerto Rico and the Primus Potteries Cooperative Association.

COOPERATIVES

The Cooperative Handcrafts, Inc., of Puerto Rico is a cooperative of needle workers, who were thrown out of employment because of the vicissitudes of that industry. The membership includes nearly 600 women, employment for which varies from 150 to 600 according to the demand for silk garments and hand-made gowns. During the year, the cooperative opened a show room at 99 Madison Avenue, New York. Because of its high quality workmanship as well as distinctive styling, it has already made a place for itself in the garment industry. The effect of the Wage and Hour Law, in closing many needlework factories, will undoubtedly mean rapid expansion of this cooperative.

The Primus Potteries Cooperative is endeavoring to develop a local industry in handcraft, pottery, and tile. The project has moved slowly, due to the necessity of training workers, creating designs, and solving the many technical problems involved. It is expected that marketing will begin within a few months.

In connection with the corn growers cooperative, a corn bin and mill was constructed at Isabela by P. R. R. A. This cooperative will begin active operation with the coming crop.

Functioning under the auspices of the P. R. R. A. Cooperative Division are the Arecibo Fruit Growers Cooperative Association, the Sociedad Agricola Cooperativa Insular, and the Puerto Rico Marketing Association for Minor Crops. Dedicated to the processing and marketing of the "Sea Island" cotton as one of the new crops for the island, the last mentioned cooperative has been in operation for 3 years. Both the insular and the Federal Governments have taken important steps to aid in its development. During the past 3 years a total of 1,233 bales of cotton was marketed, and production is increasing. The cotton, being of a special long staple variety, does not compete with cotton grown on the continent.

The Arecibo Fruit Growers Cooperative Association was organized by the P. R. R. A. to aid in the rehabilitation of fruit growers in the northern zone of the island. A modern plant has been constructed and equipped for the canning of grapefruits in slices or in juice. A unit will soon be added to the plant for the canning of orange juice.

The Sociedad Agricola Cooperativa is a farmers' purchasing cooperative society also promoted and financed by the Puerto Rico Reconstruction Administration. It is a young organization, not over 10 months in existence. In this period its membership has aggregated 240 farmers. Its efficiency is demonstrated by the fact that the society has purchased for its members 10,021 tons of fertilizers at a saving from about \$15,000 to \$17,000 to its members.

The P. R. R. A. has cooperated with every private activity or enterprise intended to aid the cooperative movement in the island. Private cooperatives such as Cafeteros de Puerto Rico, the Puerto Rico Tobacco Marketing Association, and others are directly or indirectly aided by the P. R. R. A. through its division of cooperatives.

RURAL ELECTRIFICATION

During the fiscal year 1937-38 the rural electrification division of the P. R. R. A. continued its program centering around the construction activities on the Garzas and Dos Bocas hydroelectric projects.

The Garzas Dam will create a lake with an area of 150 acres, 2,415 feet above sea level. The water from the reservoir will flow from the north to the south side of the island through a tunnel 11,700 feet long, then falling through a 1,200-foot pen stock to drive two horizontal, direct-connected 5,000-horsepower over-hung impulse water wheel and generator units at Salto Garzas Plant No. 1. The estimated annual energy output of the plant will be 24,500,000 kilowatt-hours. The power generated will be transmitted to the insular government power system over six 38,000-volt circuits.

Construction progress during the fiscal year included the completion of 10 miles of all-weather access roads, an activity carried over from last year; 3,000 feet of incline railway; a diversion dam 65 feet in height; a 12-foot diameter diversion tunnel 1,200 feet long; the driving of 4,591 feet of power tunnel; the excavation of 50 percent of the main core-wall trench; and the completion of practically all the necessary camp buildings and facilities.

The Dos Bocas project is located on the Arecibo River midway between the cities of Arecibo and Utuado on the northern side of the island, where the prevailing northeast trade winds are responsible for the heavy precipitation over this area. Thus, irrigation is not a factor in the development of the project. The station will be used as a regulating medium between the total system load and power produced by the stations, the output of which is limited in accordance with irrigation requirements.

The impounding dam will create a reservoir having an area of some 600 acres, extending approximately 5 miles up the river in both directions.

The present plans call for an initial installation of two units of 8,300 horsepower and 4,150 horsepower each, with an additional 6,300-horsepower unit to be installed whenever funds are available. The estimated annual energy output of the plant will be 30,000,000 kilowatt-hours. The powerhouse is to be located immediately below the dam, the units being served through short pen stocks.

The construction program for the Dos Bocas project during the year included the completion of practically all of the construction camp buildings and facilities; construction of cofferdam No. 1; excavation of overburden on the east and west abutments and the erection and installation of most of the construction plant equipment.

An appreciable expansion of the distribution network has been effected, bringing to hundreds of rural domiciles the benefit of electrical service and thus profoundly affecting the life of these rural dwellers. It is estimated that 1,500 radios have been installed on P. R. R. A. built distribution lines within the last 2 years.

UNIVERSITY BUILDINGS

The building program in the university project for the fiscal year ending June 30, 1938, included among other features the finishing work on the auditorium. This modern structure, equipped with an up-to-date air-conditioning and ventilating system, will provide comfortable seating capacity for 2,085 persons.

The grant of additional funds for the continuation of the building program made possible the construction of a long-needed biology laboratory building for the experiment station of the University of

Puerto Rico at Rio Piedras. It is considered that this will be a valuable asset in the insular field of scientific research and agricultural advancement.

Additional funds allotted for the ensuing fiscal year will take care of the construction of the engineering building to be located on the grounds occupied by the College of Agriculture and Mechanic Arts at Mayaguez, Puerto Rico. This building will consist of classrooms, lecture halls, testing laboratories, and shops for civil, mechanical, and sugar engineering courses.

The enlargement and reconstruction of the School of Tropical Medicine at San Juan, Puerto Rico, including its adjoining hospital, is also scheduled for the coming year.

Aside from the natural growth resulting from this enlargement of its physical plant, the University of Puerto Rico may be expected to develop in the future as an international educational institution where students in South, Central, and North America will meet, thus laying the basis for a better understanding and a more comprehensive friendship between the Spanish and the English speaking people of the New World. That, undoubtedly, would greatly improve the commercial and political relations between the nations of America.

CEMENT PLANT

When the cement plant constructed at Catano, near San Juan, was completed, the P. R. R. A. had finished one of its most important industrial projects. It is a modern cement plant with a daily production capacity of 1,000 barrels, a permanent employment capacity of 150 persons or more, and a monthly pay roll of about \$20,000 in wages. On February 19, 1938, under the name Puerto Rico Cement Corporation, the insular government incorporated the plant constructed at a cost of more than \$1,400,000. The Governor of Puerto Rico was elected president of the board of directors of the new corporation on March 15. The manager was appointed on April 6, 1938.

It is expected that under insular government operation the plant will be able to produce cement at a lower price than that at which foreign cements are delivered in Puerto Rico. The Government, both insular and Federal, normally the largest consumers of cement, will use the plant's cement for its building projects. This will result in a saving on all public construction. The capacity of the plant should satisfy about one-half of the island's annual requirements.

GENERAL ENGINEERING

The engineering division of P. R. R. A. is responsible for the construction of numerous projects located throughout the island, providing better conditions of life and work for a great number of unemployed through urban and rural areas. Many of these projects already

have been completed and most of them will be completed in the near future.

Agricultural industries, public activities, and public health have been benefited by engineering projects. A building for the tobacco institute at Rio Piedras, a cotton warehouse and gin plant and a corn bin and mill at Isabela have been constructed, aiding the tobacco, cotton, and corn growers. Three new city halls and seven new police stations constructed by the P. R. R. A. have been added to the facilities of the municipal governments. Public buildings have been repaired in different municipalities of the island.

School construction and repairs represent one of the P. R. R. A.'s most commendable contributions to the cultural and educational achievements of Puerto Rico. In the urban zone, the P. R. R. A.'s engineering division has constructed 14 new school buildings and repaired 55. In the rural zone 169 buildings, comprising 309 school-rooms, have been completed. This is in addition to 11 concrete and 8 wooden second-unit or vocational schools, the latter being erected from dismantled workers' camps.

Construction and repairs in connection with waterworks have covered the laying of new pipe lines, building and repairing reservoirs and dams in 11 municipalities. Waterwork systems were constructed at Naguabo and Quebradillas and 12 deep wells for water supply have been constructed at the resettlement farms created under the Land Utilization Program. In 46 municipalities, streets have been repaired. A total of 157.6 kilometers of roads in different parts of the island were repaired.

Funds allocated by the P. R. R. A. during the fiscal year ending June 20, 1938, provided for long needed improvements to the military post of San Juan. The project is to provide better facilities and additional space for quarters for enlisted men and noncommissioned officers, laundry, garages, shops and adequate pressure and improvements to the obsolete water supply system.

The century old buildings known as the Santo Domingo barracks, the Artillery Park and the old Manicomio Building are being repaired and restored to their original appearance.

The landing pier built at Culebra for the use of the Navy has been completed. A new naval radio station building has been recently completed at San Juan.

Parks and recreational centers have been constructed by P. R. R. A. engineers in several cities with the communities contributing to the cost. A swimming pool has been constructed at Guajataca, Quebradillas; a retaining wall at Ruiz Belvis School at San Juan; a basketball court and grandstand at Yauco and an assembly hall for girls at Santurce.

At Guaynabo work was started on an entire new school and dormitories for the Boys' Orphan Asylum. In the meanwhile the asylum was moved to Cayey and temporarily placed in a camp loaned by the P. R. R. A. for this purpose.

HURRICANE STATIC RESEARCH

During the past year, the study of the relationship between radio phenomena and meteorology has continued. Puerto Rico, in the middle of the hurricane zone, must be and is vitally interested in everything related to tropical storms. The results of this investigation were reported in part in a paper entitled "The Meteorological Aspects of Certain Radio Transmission Phenomena," which was presented to the Section of Meteorology of the American Geophysical Union under the auspices of the National Research Council in Washington on April 28, 1938.

During the past year particular emphasis has been given to a study of radio static and hurricanes with a view of determining whether or not static originates in such tropical storms and, if so, whether it is of sufficient intensity and frequency to permit the development of a radio-tracking technique to supplement the classical means now employed by meteorology for the tracking of such disturbances.

This work was carried on in collaboration with investigators at the University of Florida and other stations under their control and with the National Research Council of Canada.

A further report of these joint investigations was presented on April 29, 1938, to a joint meeting of the Institute of Radio Engineers and the International Union of Scientific Radio Telegraphy in Washington (Static Emanating from Tropical Storms by S. P. Sashoff, University of Florida). In both the published papers, tracks of tropical disturbances for the 1937 season are shown. The degree of correspondence between the paths as determined by radio methods and those reported by the Weather Bureau is examined.

URBAN HOUSING

The development of that part of the urban housing program of the P. R. R. A. originally aimed for the elimination of unsafe and unsanitary housing conditions, for the provision of decent, safe, and sanitary dwellings for families of low income, and for the reduction of unemployment and the stimulation of business activity, was continued during the fiscal year ending June 30, 1938.

Inasmuch as the funds originally allotted were not sufficient to accomplish the demolition and clearance of the existing slum areas, it was deemed advisable from the beginning to apply the funds to the construction of the tenement group, project A, situated at Barrio Miranda, San Juan, and for the partial construction of the Eleanor

Roosevelt and Juan Morel Campos developments located in Hato Rey, a suburb of Rio Piedras, and Barrio Canas, Ponce, respectively. Eight hundred and eleven units were finished during the fiscal year, including the partial completion of the utilities comprised in the whole program, which ultimately is to consist of 3,004 living units.

The Eleanor Roosevelt project now contains 445 housing units; tenement group, project A, 216; and Ponce, 150 housing units. In addition to this, Mirapalmeras at San Juan and La Granja at Caguas, two developments constructed by P. W. A. through a loan obtained from the P. R. R. A., have been transferred to the P. R. R. A., thereby adding 131 and 78 housing units, respectively, to the total. Construction of all the developments mentioned has been completed during the year, and the buildings are now occupied. Rentals range from \$6 to \$12 monthly per housing unit, including some of the utilities. Besides providing decent living quarters for families of the lower income groups, the projects represent the early experimental stage incident to any large housing program and thus furnish invaluable data to be considered in connection with future housing developments in Puerto Rico.

FORESTRY

The reforestation program initiated by the forestry division of the P. R. R. A., in cooperation with the United States Forest Service and the insular forest service, has continued its field work. To date land purchased for forestry purposes has reached the total of 22,127 acres, of which 3,364 acres were acquired during the fiscal year ended June 30, 1938.

One thousand pounds of seed have been gathered from the best types of native trees and 1,200 pounds purchased and brought from Panama Canal and Haiti. As usual, the types of trees planted have been selected from among those adapted for construction, suitable for cabinet use and quick-growing for making charcoal, which is still the most common domestic fuel in Puerto Rico.

This year the production of trees from the Cayey and Mayaguez nurseries reached 3,200,000. Nine new small field nurseries were developed during the year and added to the three forest nurseries previously existing.

The planting activities covered 1,247 acres of new areas planted and 960 acres replanted. Work on weeding and maintenance of plantations was carried on in a combined area of 10,162 acres.

Eight new miles of road were added to the total mileage of road already opened in forestry lands for the improvement of communications, and 61 miles of foot and horse trails were constructed. The forestry division has constructed three concrete buildings for ranger stations and two for experiment stations.

OFFICE OF EDUCATION

J. W. Studebaker, *Commissioner*

WHEN from childhood through adult life the people of a Nation are learning through effective educational processes that the conservation of material and of human resources is necessary to the happiness of the individual and to the preservation of the desirable things of life for all, conservation in its broadest meaning is making progress.

It is that kind of progress which the Nation's schools, colleges, universities, and other educational agencies are reporting today in greater measure it seems, than in past years. It is that kind of progress which may be noted throughout the report of the Office of Education for the fiscal year that closed June 30, 1938.

GENERAL EDUCATIONAL ACTIVITIES

AN OVER-VIEW OF THE PUBLIC SCHOOLS

In the field of elementary education, even though enrollments have shown some decrease, it should be borne in mind that the elementary school provides the basic education for all children and the only education received by many.

With emphasis upon such important service has come a fuller appreciation of some of the needs in the elementary school. These include: Increased individual guidance; health and recreational services; closer cooperation between home and school; a school organization and curriculum adjustable to individual abilities and interests; and school building and equipment adequate to serve the community in its present-day wide range of activities. Efforts are being made in many school systems throughout the country to meet such needs.

The recognized social and economic losses due to first-grade failures has been the cause of recent marked increases in adjustments of promotion standards and school organization.

The formation of curriculum laboratories and divisions within State and local school systems and in colleges and universities is a comparatively recent development. Through such laboratories committee work is guided for continuous modification of teaching materials and helpful information is made available.

Enrollments

Enrollments in public schools of the United States in 1936 showed a decline for the first time. The losses were entirely in the first six grades, but they were sufficiently large to overbalance enrollment gains in high schools and in upper grades of elementary schools.

More than 6 million pupils are now enrolled in the last 4 years of public high schools. With the addition of private high-school enrollments the total exceeds 6½ million.

In addition, there are approximately 1½ million persons enrolled in night schools and in part-time schools of various kinds, and another 300,000 in Civilian Conservation Corps camps, 90 percent of whom participate to some extent in the educational program of the camps.

Adult Education

The movement to make adult education a definite responsibility of public education has made substantial progress. There was an increased interest during the year on the part of States in financing and supervising adult programs. The number of teacher-training institutions offering professional courses in adult education and the variety of courses offered increased noticeably. The activities of local organizations together with the organization of numerous regional conferences have indicated a significant interest in this field. Studies and investigations centered largely about the social aspects of adult education, the philosophy upon which it is based, and the development of instructional materials.

Guidance

The importance of including all phases of guidance in a school service provided for the adjustment of pupils has been emphasized by educational leaders during the year. The result of a superintendents' tour conducted by the National Occupational Conference for the purpose of studying guidance programs and adjustment services in some of the larger school systems, stimulated a wide interest in such service. Considerable work was done in the development of occupational information for vocational guidance and placement services.

Parent Education

A State-wide program of parent education was established in Pennsylvania under legislative enactment. This is the third State to establish a parent education program under legislative enactment. New York and California are the two other States that have such programs.

At least 36 cities now have parent education programs sponsored by their public-school systems.

Universities and colleges offered an increased number of courses and institutes in summer and in regular sessions during the year for the development of leadership in parent education and family life education.

Health Education

For purposes of safety, health, and economy a more careful selection and training of custodians for school buildings has been developing. The lines between physical education and recreation have seemed to fade somewhat. Facilities and supervision for play have been more frequently furnished. There has seemed to be a returning interest, after a half century of decline, in the adequate instruction of high-school students in the subject of hygiene.

Problems of conservation of natural resources have been considered by State departments of education in plans for curriculum revision and in preparation of teaching materials. No single practice has been followed with respect to its introduction in the school program. Elementary and high schools sometimes teach conservation in social studies or science; and some universities and teachers colleges are offering it either as a regular or a special course. The Office of Education during the year issued publications on phases of the general subject, and held a conference of educational leaders and of leaders in the conservation movement at which ways of incorporating the subject in the curriculum were discussed.

Exceptional Children

The education of children deviating from normal in mental, physical, or emotional traits continues to be a problem of vital concern. Among significant developments during the past year has been the interest on the part of State authorities in effecting State organizations to handle the problem on a sound educational basis. The education of exceptional children is closely related to elementary and secondary education for all children. It is increasingly recognized that, even while needed special provisions are important, the differences between exceptional children and so-called normal children should be minimized and the likenesses emphasized. In line with this, the Office of Education has recommended in its consultative services to States that regular elementary and secondary supervisors be given a close relationship to the program, cooperating with special supervisors of the work, or, if special supervisors are not available, taking the lead in effecting curricular adjustment for special groups. Specific services limited by law to the vocational training and placement of physically handicapped adults and young people of employable age are available from State bureaus of vocational rehabilitation. A coordinated program among all these agencies, without duplication or infringement of responsibilities, is the goal to be achieved.

Rural Education

Recent rural school developments have shown increased evidence of a more general recognition of the inadequacy of the small, local district as a unit of school administration. Numerous studies have

been made to create units of school organization through which children, even in the sparsely settled areas, can more easily be provided with modern programs of public education. Such studies have been primarily concerned with two problems: First, evolving plans for a more equitable distribution of the burdens of financing education in rural communities; and, second, organizing schools sufficiently large to insure efficient use of the personnel and equipment needed for a diversified program of public education.

Not since the early twenties have so many of the one-teacher schools been abandoned and their activities transferred to larger schools as during the past year. Comparatively few new one-teacher schools have been established. Statistics now show approximately 4,000 fewer schools of this type per year. The present success in displacing the "little red schoolhouse" with larger schools has received considerable impetus (1) from the financial aid given by the Public Works Administration to the construction of new school buildings, (2) from increased road building activities, (3) from a growing demand in rural communities for secondary education, and (4) from a clearer realization of the needs of rural people for educational opportunities equal to those provided in the cities.

Negro Education

The number of States that are appropriating funds to pay tuition and traveling expenses of Negroes to do graduate and professional work in other States when there is no opportunity to attend the university of their home States has increased. Three States have recently made provision for Negroes to do graduate study in their own States. Advancement has also been noted in the tendency to improve the salary situation among Negroes, and in curriculum studies and school reorganizations now taking place.

Growth in vocational education for Negroes is evidenced by the many requests which have reached the Office of Education from city and State school systems for information and assistance in reorganizing their programs; and by the inclusion of a discussion of the problems of vocational education for Negroes on the programs of National, State, and regional education associations.

Territories and Outlying Parts

In the Territories and insular possessions, as in continental United States, there has been considerable activity in curricular adjustment and in school organization. In Hawaii and the Canal Zone committees of teachers and supervisory officers have been at work on activity units on the elementary and secondary levels. The problem of teaching English with special reference to approved methods and to locating types of errors in order to find means by which they can be overcome, has received particular attention in Hawaii and Puerto Rico.

There has been considerable activity, especially in Puerto Rico and the Virgin Islands, in certain types of educational work (e. g., school buildings and adult education) through Federal emergency funds.

The special needs of children from foreign-speaking homes who are often underprivileged due in part to social and economic and in part to language handicaps are more clearly recognized year by year. As a result, improvement in class organization and methods of teaching is under way both in sections on the continent where there are large numbers of bilingual children and in outlying parts. A number of research studies have appeared during the year on teaching problems with bilingual children, five of which were contributed by the Office of Education through a cooperative project with universities and colleges interested in this field of work.

Financing of Schools

Financing of public education was on a better foundation in a number of States during the school year 1937-38 as a result of revisions of State school support plans made by the respective State legislatures. The idea that the State shall equalize the costs of a foundation education program became more general among the States, and, consequently, more legislation to that effect was operative during the past year than during any previous time.

OF HIGHER EDUCATION

Enrollments in a selected list of 602 approved or accredited institutions show for 1937-38 an increase of 3.6 percent over the preceding year. Assuming that this increase was true of all institutions, the total enrollment of full-time students in 1937-38 was approximately 1,300,000 and the grand total, including full-time, part-time, and summer school students was above 2,000,000. These increases, however, were only about half as great as corresponding increases for the previous similar period.

The junior college has continued to grow. In 1936-37, 528 junior colleges were reported with an enrollment of 129,106. In 1937-38, 553 were reported with an enrollment of 136,623, an increase over the preceding year of 5.8 percent. Junior colleges are primarily coeducational; 417, or 72 percent, are of this type.

The number of higher educational institutions of all classes in this country reported by the Office of Education for 1937-38 is 1,686, or 2 fewer than for the year preceding.

Professional Schools

There is little indication of change in professional schools, although increasing attention is being given to their social obligations. Important is the completion this year of the accrediting of all but 15 of the 155 degree-granting engineering schools in this country by the Engi-

neers' Council for Professional Development. This means that the engineering schools whose curricula are thus approved are considered competent to prepare engineers for the professional examinations of State Boards of Engineering Examiners which are required for license to practice in the majority of States.

The past year has seen an exceptional amount of discussion among leaders regarding the philosophy of higher education in its bearing on public service.

OF LIBRARY SERVICE

Public-school libraries have made notable progress during the past two decades and have assumed a position of importance in elementary and secondary school education. Their present status has been shown in part by a recently completed study on school library statistics for 1934-35, the first in a series which will isolate public-school library data from those of other libraries and which will build up eventually a body of comparable data.

The tabulations for this study, based on returns from half of the public-school systems, show 61,303 libraries in the 66,101 public elementary and secondary schools reporting. Of these schools, 27,836 are served by centralized libraries and 33,467 by classroom collections only. The total number of volumes in the centralized libraries is 28,346,250 and the total number of children served by them is 7,209,674, which is 57.67 percent of the pupils enrolled in the school systems reporting.

In the college library field continued attention is being paid to the problem of integrating the library with the teaching work of the college. Increasing emphasis is being placed upon the reader and the use of books rather than upon the books themselves or the technical processes involved in their handling.

With the object of improving service, a plan is being developed by the College Library Advisory Board of the American Library Association to encourage college libraries to undertake self-surveys in accordance with procedures which the Board has set up.

FEDERAL ACTIVITIES

During the year the Federal Government continued to give financial aid in support of various educational activities. Under the Bankhead-Jones Act of 1935 and the George-Deen Act of 1936 each State and Territory received larger sums for various types of vocational education for the year 1938 than for any preceding year. Allotments by the Works Progress Administration and the National Youth Administration to assist needy individuals to improve along educational lines were somewhat larger than previous allotments. Grants for school-building purposes by the Federal Emergency Administration of Public Works amounted to nearly \$50,000,000.

The Office of Education through Federal emergency grants continued four of the special projects which were in operation at the close of the preceding year. These projects were: Forum demonstrations; educational radio; local school administrative units; and a survey of vocational education and guidance of Negroes. Federal educational activities during the year also included provisions for schools by the Tennessee Valley Authority; and assistance granted by the Federal Housing Authority and other Government agencies.

ADVISORY COMMITTEE REPORT

The President's Advisory Committee on Education submitted its report to the President, February 18, 1938, in which it recommended the continuation of existing Federal grants and the initiation of new grants to the States for educational purposes to begin at \$70,000,000 in 1939-40 and to increase to \$199,000,000 in 1944-45. The grants recommended by the Advisory Committee would be divided into six major funds, namely: (1) A general aid fund for current operating and maintenance expense of public, elementary, and secondary schools; (2) a fund to improve the preparation of teachers; (3) a fund for the construction of school buildings; (4) a fund for the improved administration of State departments of education; (5) a fund for civic, general, and vocational part-time adult education activities; and (6) a fund for rural library service.

The Committee also recommended a special Federal fund for cooperative educational research, demonstration and planning, to be administered by the Office of Education. The amounts recommended are \$1,250,000 during the fiscal year 1938-39; \$2,000,000 in 1939-40; and \$3,000,000 during each of the succeeding fiscal years through 1944-45. The fund would be available for expenditure under the direction of public and private nonprofit institutions and agencies approved by the Office of Education, on the basis of cooperative projects jointly agreed upon.

RESEARCH AND INVESTIGATION

IN ELEMENTARY AND HIGH-SCHOOL FIELDS

The Office of Education recently completed its 2-year study of Local School Administrative Units in 10 States. This project whose purpose was to explore the possibilities for the organization of more satisfactory local school units—attendance, administration, and finance—was guided and coordinated by the Office of Education project staff and was financed by a grant of approximately \$864,000 of Federal emergency funds.

The project staff of each participating State—Arizona, Arkansas, California, Illinois, Kentucky, North Carolina, Ohio, Oklahoma, of the study in the State and made individual county reports giving findings and proposals for counties studied. The State reports are

Pennsylvania, and Tennessee—issued a State report on the findings available from the respective State departments of education, and many county reports are available also from these State departments.

The Office of Education project staff prepared two publications based on data submitted by the State projects, one of which describes the work of the State projects, summarizes their findings and analyzes the status of existing school units in these States, and the other of which formulates principles and procedures for prosecuting studies of local school units.

The States participating in the study have expressed their intention to make further use of the project data filed in the State department offices and to continue to study this problem. States cannot be expected in a short period of time to put fundamental changes into effect; but the study has contributed already by pointing out the necessity for changes and by indicating specifically the types of changes needed and the way in which such changes can be most satisfactorily made.

Among other studies in public-school fields made during the year by the Office of Education are the following:

(1) The purpose and amount of all Federal Government expenditures for education during the 2 years, 1936 and 1937.

(2) The study of legal provisions for public-school finance which was under way in 1937.

(3) The progress of educational legislation in the several States and in Congress. During the year the Office of Education studied such progress. A circular was issued on educational measures which shows the status of educational legislation at the close of the Seventy-fifth Congress.

(4) An analysis of public funds for education in each of seven States. This study was made in cooperation with universities.

(5) A series of study outlines inaugurated at the request of the American Association of University Women. These outlines were used to meet the needs of local branches of the Association interested in studying the public-school system. The outlines were used by many other organizations. They are being printed so as to be more widely available.

(6) The opportunities for the preparation of elementary school supervisors. This study gives information on three questions: In what colleges and universities are curricula offered for general and special subject supervisors of elementary schools? What is the content and the academic level of the curricula? and, To what extent do the curricula offered seem to meet current requirements for the preparation of such supervisors?

(7) Curriculum laboratories and divisions, their organization and functions in State departments of education, city school systems, and institutions of higher education.

(8) A survey of courses of study and other curriculum materials published since 1934. This study contains an annotated list of current courses of study.

(9) The elementary school principalship. This study describes the types of principalships, the proportion of men and women employed as principals, the organization for administration of elementary schools, and the opportunities for the preparation for this field of service. It summarizes the current practices in the certification of elementary school principals.

(10) A study of the offerings and registrations in high-school subjects 1933-34. This is a study of registrations in 206 different subjects offered in nearly 18,000 high schools reporting.

In addition to the studies noted, the Office compiled and codified for the first time the published Federal rules and regulations with respect to education. This codification is to be published in a forthcoming publication of Federal Rules and Regulations.

IN HIGHER EDUCATION

The Office has continued its study of graduate work and research during the past year. A final conference for the purpose of defining the function of the graduate school in relation to the Nation's resources, human and material, was held in June 1938 at the Johns Hopkins University under the direction of the Commissioner of Education.

Among other studies in higher education fields made by the Office during the year were the following:

(1) The economic status of college alumni of 31 colleges and universities in the United States.

(2) A study of State programs for the certification of teachers. This presents principles relative to the administration of certification and of its requirements in the several States, and suggests means whereby certification systems may be improved.

(3) Two-year terminal programs in engineering schools. These programs were studied by the Office during 1937-38 with the cooperation of the Society for the Promotion of Engineering.

(4) Relationship of State government to higher education. This long-time research project into the relationship of State government to higher education was continued during the year. Its primary purpose is to collect information and develop principles and theories that may serve as a basis for legal enactments improving the relationship of the State to higher education. During the past year another bulletin was completed dealing with the status and position of educational institutions in the scheme of State governments.

(5) Projects in aid of college students. These were studied to learn of the opportunities provided by colleges for reducing the living expenses of students and for providing work with which college students might meet a part or all of their college expenses.

(6) Leading institutions of higher education in England, the Scandinavian countries, and Paris. These institutions were studied during a field trip made by a representative of the Office of Education.

IN SPECIAL EDUCATION

Constant demands have come during the year from school officials for curriculum materials, especially in the newer fields. In an effort to meet such demands several studies were prepared dealing with approved methods of teaching and with provisions of materials. These studies are concerned with conservation as a school activity, the contribution of visual aids to school programs, and the use of school museums and school excursions as educative tools with special reference to their contribution on the elementary level.

The first step was taken during the year in the investigation of the organization of clinical facilities for the adjustment of behavior problems of school children. This is a growing development in guidance programs, and school administrators are eager for help in the organization of this service. An analysis by means of a questionnaire of existing facilities and a conference to discuss pertinent problems have paved the way for a more thorough study of the field during the coming year.

Other Research

The report on the National Survey of Vocational Education and Guidance of Negroes, conducted as an emergency relief project, was completed. Studies made in rural education problems dealt with the economic status of rural teachers, the salary and training of rural school personnel, and educational conditions in the Southern Appalachians. To promote the provision of vocational training for handicapped adolescents, an analysis was made of the extent and types of occupational experiences offered them in the day schools which they attended.

IN HEALTH AND PHYSICAL EDUCATION

An investigation of provisions for, and administration of physical education in institutions of higher education was completed and published during the year.

The study of the selection, training, duties, and supervision of school custodians in communities having a population of 2,500 or more was completed, and also the related study concerning personnel and provisions for safety and sanitation in institutions of higher education.

A circular listing sources of material for the observance of May Day as Child Health Day was prepared and published. A study in the field of curriculum construction relative to essentials and methods in health instruction is in progress.

IN MEASUREMENT

The Research in Universities Study on some factors in the adjustment of college students was completed this year. It summarizes and analyzes the research carried on in some 13 universities in an investigation of certain factors predictive of success or failure in college.

The cumulative records of 177 school systems were analyzed and suggestions for use of schools in setting up cumulative record systems were developed.

An analysis has been carried on of the methods of reporting to parents. There has been considerable experimentation taking place in this field, and any effort to aid in this problem should be of value.

Preliminary work in the use of aptitude and other measures in educational and vocational guidance has been under way. Intensive work was begun on one phase of measurement of guidance—that of interest. Preliminary plans have been made for studying new methods of

evaluation. The introduction of the objective or new-type tests has reawakened interest in the general problem of evaluation.

IN GUIDANCE AND INDUSTRIAL EDUCATION

A report of a study on the place of industrial arts in the program of education, which had been in progress for 2 years, was completed.

At the request of the International Bureau of Technical Instruction, a report on technical education in this country was prepared for the International Congress on Technical Education held at Berlin. This report is to be included in a publication by that Bureau.

IN LIBRARY SERVICE

The Library Service Division has been working on plans to secure comprehensive data on public library coverage, growth, use, and support, with a view to attacking the problem of the extension of library facilities to areas now without them.

In the field of librarianship, a study of professional library education was completed. This investigation, undertaken with the needs of the prospective library school student in mind, considered the preprofessional education required, the library school curricula, and the training and qualifications needed for the different types of professional library work.

The textual material was prepared to accompany the 1934-35 school library statistics which were based on returns from 66,101 schools in the 3,130 school systems reporting.

Work has also been in progress on school library administration and on school library legislation as well as some preliminary work on a regional library service study.

IN SCHOOL BUILDING PROBLEMS

The Office of Education completed a study of the school building situation in the United States which indicates (1) the need of continued aid from the Federal Government for school building construction and (2) the necessity for scientific long-range studies of school building needs.

This study showed that in spite of the fact that from December 1933 to December 1936 the P. W. A. allotted \$244,976,114 in grants and loans for public-school buildings, the total estimated cost of which was \$469,005,001, yet 62.3 percent of all the cities of 10,000 population and over estimated that an additional \$496,745,782 is needed for school-building construction. The main reason for this continued need is that the schools had not caught up with the lag in school-building construction during the World War.

A very different kind of building from that which was erected over 30 years ago is demanded today. School buildings must now provide not only accommodations for academic work but rooms for science, art, music, shop work, dramatics, and play, and they must be so constructed as to serve the community as well as the school pupils. Yet

39.3 percent of all school buildings in 506 cities of 10,000 population and over are more than 30 years old. Such buildings cannot serve the needs either of children, or of the youth and adults to whom the school should offer opportunities for education in new lines of work and for recreation during their leisure time.

Information in regard to the school plant in the United States is extremely meager. But few States have had the funds to make the surveys necessary to determine where new school buildings should be erected and where existing buildings should be abandoned with a view to reorganizing school districts into larger administrative units. The lack of information is serious because millions of dollars are spent, and will doubtless continue to be spent, on school building construction every year.

It seems obvious that in providing for wise expenditure of these large sums for school buildings it is necessary for each State (1) to have the facts about the present situation in regard to the school plants in both rural and urban areas; (2) to make studies of population trends with a view to estimating where buildings are needed; and (3) to plan school-building programs with a view to reorganizing the many small school districts into larger centralized districts.

IN STATISTICS

The collection, compilation and presentation of data to show the National status of education is an important function of the Office of Education. More than 35,000 schools, school systems, and institutions of higher education submit reports periodically by mail or through field contacts. Studies on which material was collected or tabulated in 1937-38 are shown in the following table, in which capital letter C stands for data collected; T, tabulated; and C-T, collected and tabulated within the year.

Subject of study, 1937-38	Type of study		
	Biennial	Periodic	Special
Federal: Expenditures for education, 1935-36 and 1936-37.....		C-T	
State school systems: Personnel and finances.....	T		
City school systems:			
Personnel and finances.....	T		
Per capita costs.....		C-T	
Per pupil expenditures by type of school and size of city:			
Free textbooks.....			T
Educational supplies.....			T
Operation of plant.....			T
Maintenance of plant.....			T
Capital outlays.....			T
Administration.....			T
Higher education:			
Personnel and finances.....	T		
Land-grant colleges.....		C-T	
Receipts and expenditures (preliminary).....		C-T	
Elementary schools: Progress and trend in passing of small rural schools.....			T
Secondary schools: Subject registrations.....		T	
Offering of rural high school by size of enrollment.....			T
Teaching staff: Economic status of rural teacher.....			T
Custodial staff: School janitor or custodian.....			C-T
Libraries: Public elementary and secondary school.....		T	
Residential schools for exceptional children: Personnel and finances.....	T		
Negro education: Personnel and finances.....		T	

IN COMPARATIVE EDUCATION

As a major piece of research and investigation for the year, the specialist in Western European education of the Office visited the Scandinavian countries, the Netherlands, and Finland to study the education of elementary and secondary school teachers and to gather official and other data relating to education in those countries. The project included a brief period in Germany, where the Terramare Office, the Ministry of Education, the University of Berlin, the Technical University, and the Amerika Institute were visited.

The study, a decennial survey of education in countries other than the United States, was completed; a manuscript on education in Germany was also completed; and a manuscript on education in Yugoslavia has been under way during the past year.

DEMONSTRATIONS AND DEVELOPMENTS

EDUCATIONAL BROADCASTING

Broadcasting activities of the Office of Education during the past year were made possible under terms of the Emergency Relief Administration Act of 1937 by an allotment of \$128,698.

"Brave New World"

The high light of the radio activities carried on by the Office during the year was the production of a series of 26 half-hour programs entitled "Brave New World." The purpose of the series was to develop appreciation and understanding on the part of our own people and to further the friendship between the United States and Latin America by offering to radio listeners an opportunity to learn of Latin-American history, culture, and present-day problems.

As an outgrowth of the emphasis placed at the Buenos Aires Conference of 1936 on the importance of international understanding, officials of the Department of State, the Pan American Union, and the Commissioner of Education laid the basis for this series of broadcasts.

The Columbia Broadcasting Co., cooperating with the Office of Education, provided a network of 102 stations—one of the largest networks ever employed in educational broadcasting. This network also contributed the services of a production director, several professional actors, and the Columbia Broadcasting System orchestra.

More than 70,000 communications from listeners and the fact that "Brave New World" was awarded first prize as an educational dramatic radio series by the Ninth Annual Institute of Education by Radio, bear testimony to the effectiveness of these broadcasts.

"The World Is Yours"

Other activities of the year included the preparation and production of "The World Is Yours," weekly broadcast in cooperation with the Smithsonian Institution, over the facilities of the National Broad-

casting Co. This series ran for 51 weeks in the fiscal year 1937-38. Through dramatizations of Smithsonian activities and exhibits, it gave the listener information and stimulated interest in the fields of history and natural science.

Other Programs

Further, the Office of Education assisted the United States Department of Commerce with the preparation and production of the weekly series, "Stories of American Industry" which were released through the facilities of the Columbia Broadcasting System.

The Office of Education also produced its regular weekly broadcast, "Education in the News" over the facilities of the National Broadcasting Co.

Good Will

An international broadcast on May 4, 1938, entitled "Calling All Countries," was jointly sponsored by the Office of Education and the American Red Cross over the National Broadcasting Co. Red Network facilities and over short-wave facilities of the General Electric Co. In this program the birth of the Junior Red Cross was dramatized in the promotion of international good will.

In addition to broadcast activities efforts were made to analyze the radio audience, to build files of late information on educational radio work throughout the United States, and to plan for the establishment of a small research section to analyze the new and various problems of radio in education.

SCRIPT EXCHANGE

Under the sponsorship of the Federal Radio Education Committee, in cooperation with the Radio Division of the Office, the Educational Radio Script Exchange was organized in October 1936 to serve as a central clearing house for radio scripts and production suggestions. By this means educational groups in various parts of the country exchange materials and experiences, and local educational organizations are helped to become sufficiently adept in radio broadcasting to enable them to secure time on the air and to do a quality of broadcasting which justifies cooperation by the local stations.

The script exchange has filled requests for more than 140,000 copies of radio scripts from schools and colleges, radio stations, civic organizations, dramatic societies, and clubs seeking practical suggestions for preparing and presenting educational radio broadcasts. These groups have received more than 16,000 copies of radio manuals, glossaries, handbooks of sound effects, and music arrangements which serve as supplementary aids to production. Only one copy of any script or production aid was sent to any given organization or person requesting material. Duplicate copies of the scripts for production purposes were prepared locally.

While hundreds of school groups have found the services of the exchange valuable in preparing mock broadcasts over public-address systems, before assemblies, or from a central control room to other schoolrooms within the school building, and have used the scripts for study purposes and as models for writing original scripts in connection with radio courses, many of the groups have produced the scripts over the facilities of their local radio stations. Since October 1936 several hundred school groups have reported the production of more than 3,000 programs based on script exchange continuities over the facilities of some 220 different radio stations located in 43 States, the District of Columbia, and several Territories and Canadian Provinces.

Through the services of the exchange a radio script can be used successfully many times after it is initially broadcast. In a very true sense, therefore, the exchange serves as an agency for the conservation and widespread utilization of creative ability. A third edition catalog describing the materials available in the script exchange was issued in May 1938.

THE FORUM PROJECT

Forum demonstrations conducted under the sponsorship of the Office were continued during the 1937-38 season in some of the smaller communities of the country. Federal funds amounting to \$260,000 were made available to the Office of Education to finance the program from November 1937 to June 1938.

The funds were used for three main purposes: (1) For the employment of a Washington staff composed of an assistant administrator, a field counselor, 3 field representatives, a senior research assistant, 3 secretaries, and 5 clerk-typists qualified by local W. P. A.; (2) for the employment of a staff of 480 relief workers assigned to communities throughout the country; and (3) for the employment of 13 forum leaders who traveled from area to area, staying from 2 to 6 weeks for each program.

Cooperative Centers

The cooperative demonstration centers, as they were named, were in 18 areas of the country. Each area served from 5 to 10 communities. The administrative centers for the various areas were: Jefferson County (Birmingham), Ala.; Phoenix, Ariz.; Pocatello, Idaho; Herrin, Ill.; Anderson, Ind.; Lexington, Ky.; Jennings, La.; Kalamazoo, Mich.; Gulfport, Miss.; Butte, Mont.; Warren County, N. J.; Somerset County, N. J.; Monmouth County, N. J.; Santa Fe, N. Mex.; Norman, Okla.; Tyrone, Pa.; Columbia (University of S. C.), S. C.; Montpelier, Vt.; Burlington, Vt.; Windsor, Vt.; Lynchburg, Va.; and Cheyenne, Wyo.

The emphasis of this program was placed on the problem of local initiative and autonomy in organizing and administering forums in smaller communities with populations ranging from approximately 1,000 to 25,000. The objective of the demonstrations was to assist local authorities to plan and administer programs where several independent school systems of limited resources might cooperate and pool their funds to provide educational forums under qualified leadership. The average population of the individual community was 9,089.

These cooperative forum programs have sought to demonstrate a practical means by which a leader may be shared by several school districts in operating a carefully planned series of forums.

Local Committees

Local advisory committees were established and usually assisted the local superintendent and board of education in selecting the subjects to be discussed. Such advisory committees made up of representative citizens also helped in promoting interest in the program.

Efforts were made to acquaint audiences with suitable reading material on public affairs; pamphlet displays were set up and bibliographies were mimeographed and distributed. Libraries were often too inadequate to meet the needs, but all possible cooperation with local librarians was established.

In the 153 communities served by the forum leaders, 1,129 regular meetings were held. The total attendance numbered 125,119, with an average for the whole program of 110 per meeting. Attendance at 806 other than regular meetings totaled 155,191.

Ten of the original nineteen demonstrations of 1936-37 were continued during the 1937-38 season with the assistance of relief workers paid from the emergency funds allocated to this Office. Such centers used leaders paid from funds made available locally or volunteer leaders. Relief workers paid by the Office also assisted some 25 new communities to carry on forum programs. From both these groups a total of 1,896 meetings were held with an attendance exceeding 155,797.

State Conferences

With assistance from the Office, State departments of education sponsored State forum conferences to promote a wider understanding of the needs for and the problems involved in the organization and operation of public forum programs. These conferences brought together educational leaders from the schools, the universities, and the community. "The purpose of these conferences was to explore the resources, interests, and objectives involved in developing adult civic education through forums" in each State. Thirty-five States held such conferences with a total attendance of 1,552 and an average of 43.

As a result of the deliberation at the conferences action taken was expressed in the following ways:

- 31 States appointed continuation committees for study and action.
- 22 States passed resolutions suggesting some definite action to advance adult civic education.
- 4 States planned adult education surveys.
- 9 States planned to set up cooperative forums.
- 6 States suggested local enabling legislation.
- 14 States suggested training courses for forum work.
- 20 States urged Federal aid.

Many significant results of these conferences can never be tabulated or analyzed. The gains made by forum demonstrations were consolidated, the progress made in each State was more adequately reported, the forum idea was still further promoted, and action for State-wide programs was more specifically planned. The real results of such a program can be measured over the years.

STIMULATING AND COORDINATING RESEARCH

THE LIBRARY

A marked increase in the use of the reading room, in circulation and in work accomplished by the staff has been noted during the first year in the new consolidated library quarters in the Department of the Interior building. For the first time in its 70 years of existence, library facilities have been adequate, and service commensurate with the distinguished collection of books has been possible. Several collections that had previously been stored because of lack of shelf space are now arranged on the shelves so as to be accessible.

During the year the education division of Harvard College Library turned over a great quantity of duplicates which have been invaluable in completing files particularly those of reports of State and city boards of education. Some 3,000 of these have been sorted and cataloged and where long runs have been completed, volumes have been bound. Consequently, this collection, so valuable for the study of the history of education, is in far better condition than it has ever been. In order that the collection may serve its fullest purpose, the current issues of board of education reports have been filed in the reading room where they may be used by anyone interested.

During the year there were 15,266 readers in the library, while during the previous year there were but 6,785. The circulation of books more than doubled.

Considerable progress has been made in organizing the collection of comparative education material. With the aid of W. P. A. workers, the bound files of the French and German periodicals were completely cataloged this past year. The greater part of the journals in the other languages are still to be cataloged.

The collection of courses of study has been arranged in a place convenient for use, and many teachers and students have had access to it. A constant check has been kept of all new courses issued and immediate application made to State and city boards of education for them.

An unusual demand has come from curriculum committees and librarians of boards of education for the loan of courses of study. As far as possible this demand has been met with duplicates which were in the collection. A plan is now projected to collect duplicates and have them available for loan outside the library.

Early in the year there was prepared in the library a list of the publications of the Office of Education covering the years 1910-36. As soon as this list was printed and distributed librarians all over the country checked their holdings and wrote for publications to complete their files. From the collection of duplicates in the library many of these requests could be granted, while the file itself has been replenished by the duplicates returned by other libraries.

By gift and by purchase many rare and out-of-print volumes have been added to the textbook collection. It is hoped that a collection of modern children's books may be developed which will show inquirers of the future, the kind of books that were read by children in the mid-twentieth century, as well as give a basis for comparison with the nineteenth century reading.

Bibliographical materials have been prepared for the series of Good References on the following subjects: Conservation Education in Secondary Schools; Conservation Education in Elementary Schools; Wildlife: Birds, Animals, Flowers; Trees and Forests; The County Superintendent and Administration of Rural Schools; Visual Education (Revised); Teaching of Music in Rural Schools; Teaching of Art in Rural Schools; Education and Social Change (Revised). Miscellaneous lists of references have been prepared upon request in many fields of activity.

COORDINATION OF STATISTICS IN LIBRARY SERVICE

The Library Service Division has participated in the preparation of uniform statistical report forms for public libraries and for the libraries in the institutions of higher education. It is hoped that the joint use of these blanks by the State library agencies, the American Library Association, and the Office of Education will facilitate the gathering of comparable and adequate library data.

COOPERATION WITH UNIVERSITIES

The Office of Education completed its publication material growing out of its cooperative research with 60 universities during the previous year. Several of the universities which cooperated in this project

are publishing additional findings and information. The studies were made possible through emergency funds.

COOPERATION WITH OTHER COUNTRIES

Requests for cooperation in making studies of education in other countries totaled 190 during the past year. Classified according to the purpose expressed, they were as follows:

Professional use.....	21
Doctoral dissertations.....	4
Masters' theses.....	5
Theses, grade not given.....	12
Reports or term papers.....	20
Study groups.....	11
Purpose not given, plainly from college students.....	33
Purpose not given, probably from college students.....	48
High-school students.....	6
Junior high school students.....	25
Elementary school students.....	2
Libraries.....	3
Total.....	190

Besides these studies carried on by correspondence, much aid was given to students from nearby institutions who came to the Office for personal direction and advice in writing papers.

UNIFORM RECORDS AND REPORTS

The Office has continued its cooperation with State departments of education in the interest of more uniform records and reports through visits to 25 States and Puerto Rico to assist in interpreting the new State school system form and revising record systems to obtain the data desired. The form for use in collecting data from public libraries was completed and preliminary work done with the American Library Association on a form for collecting data from college libraries.

POLICY FORMING

RELATIONS WITH STATE DEPARTMENTS

As a result of a resolution adopted by the National Council of Chief State School Officers, the Office inaugurated a cooperative study with that organization on the problem of accreditation of post secondary institutions by State departments of education.

The study involved a number of different phases, such as a topical analysis of the existing standards for accreditation; existing practices of State departments of education in accrediting institutions for teacher preparation and general collegiate purposes; criteria for establishing and accrediting junior colleges; accreditation of private schools of music, dramatic art, and physical education; responsibility of State departments of education for assuring satisfactory standards

in private business, trade, and commercial colleges; the part played by State departments of education in developing an adequate economical and unified system of education including higher education in the State; and the like.

The chief State school officers are cooperating with the Office in collecting factual data on the different phases of the study. It is hoped that on the basis of these data fundamental principles may be formulated and recommendations may be made that will be useful to the State departments of education in adopting satisfactory programs of accreditation.

COMMITTEES

In addition to serving on various committees which functioned within the Office, staff members have carried a wide range of responsibilities on policy forming committees outside the Office organization. Examples of agencies and groups with which such cooperation has existed are: The President's Advisory Committee on Education; National Education Association; International Committees on Open Air Schools; Technical Committee on Public Health and Safety Education, and Recreation; American Association of Health and Physical Education; National Congress of Parents and Teachers; Progressive Education Association; American Council on Education; American Red Cross; American Library Association; and many others.

FEDERAL RADIO EDUCATION COMMITTEE

Of the nine major studies reported a year ago to be undertaken by the Federal Radio Education Committee, two are under way.

One study deals with the question of evaluating radio broadcasts for schools. An examination is being made of selected programs in the more important subject-matter fields to ascertain what they are accomplishing and where they are falling short. A second phase of the study is expected to furnish guidance to teachers in selecting and using various types of school broadcast programs. Still another phase covers the development of techniques for evaluating various radio programs. This entire study is being undertaken by Ohio State University and has been financed for the first 2 years of its operation by a grant from the General Education Board. The cooperation of some 60 schools, located at strategic points in 4 different areas of the United States, and representative of rural, town, and city districts will be utilized during the progress of the study.

The second study has been initiated by Princeton University on a grant from the Rockefeller Foundation for a 2-year period. This study will involve many classifications of listeners representing various ages, different cultural and economic levels, and a wide geographic distribution of residences. It seeks to ascertain the listening habits of these different groups, what information they have secured from radio,

and what improvements or changes such listeners feel should be made. It is expected that one aspect of this study will also deal with the rather critical problem raised by organizations concerned over the influences on children of certain types of radio programs.

The remaining studies, to be supported by the broadcasting industry, are soon to be undertaken in cooperation with the Office of Education. Designed jointly by representatives of the broadcasting industry and specialists in the field of education, these studies are intended to deal with existing practical problems in this field.

It is hoped that they will indicate ways and means for working adjustments that will lead to a wide use of the facilities of radio as a teaching tool, both in the classroom and in programs of adult education.

FIELD SERVICE

CONSULTATION AND ADVISORY SERVICE

At the request of the Commissioner of Education of Puerto Rico three members of the Office staff, the chief of the statistical division, the specialist in State school administration, and the specialist in secondary education, were detailed to spend a month visiting schools in Puerto Rico, observing educational conditions there, and preparing a report for submittal to the Commissioner of Education of the island.

Upon invitation of the South Dakota State Superintendent of Public Instruction the specialist in school finance worked with the State department of education in preparing materials for the State superintendent as a basis for revising the State's plan for school support.

At the request of the Director of the School of Education, Hampton Institute, Virginia, the senior specialist in elementary education spent a week at that institute in studying its proposed program for elementary school teachers and in advising the Institute's staff with respect to the proposed program.

The senior specialist in school building problems rendered consultative services to Mount Vernon, N. Y., relative to the school building problem, and also to Rockland County, N. Y., relative to the reorganization of many small school districts in accordance with the survey recommendations made by the Office of Education the preceding year.

The Office also rendered service to the Public Works Administration, at its request, in developing standards for the construction of school buildings to replace buildings which were fire hazards. The Office reviewed 46 proposed projects for the Central Reviewing Committee of the Works Progress Administration. Fourteen members of the Office cooperated in making these reviews.

One staff member of the Office visited the Canal Zone, investigating the system of education and consulting with educational officials.

Calls for advisory service have come to the newly organized library service division from a wide range of places, no fewer than 41 different States being represented and also Alaska, the Philippines, and Puerto Rico. Among those making requests have been individual librarians, library trustees, representatives of State library agencies, officers of State education departments, citizen groups, and professional associations. Advice has been sought on such subjects as methods of organizing libraries in small towns, regional library service, State-wide library planning, library service for young people, school library legislation, school library administration, and education for librarianship.

INFORMATION SERVICE

PUBLICATIONS

A pictorial presentation of the purposes and services of the Office of Education was a unique publication of the past fiscal year. This 80-page bulletin, entitled "To Promote the Cause of Education," was first issued as the February number of *School Life*, but the edition was soon exhausted and the publication is now available as a bulletin, designated as 1938, Misc. No. 2. The nine other numbers of *School Life* issued during the year were devoted for the most part to: Presenting a bird's-eye view of important educational research and demonstrations in all educational fields, the source materials for which are available only in the Office of Education; and reporting upon activities of other Federal Government agencies.

The following table shows the total number of manuscripts and other reproduction materials that were completed for distribution during the fiscal year:

Manuscripts and Other Materials Completed During Fiscal Year 1938

Source of manuscript	Total—		Source of manuscript	Total —	
	Printed publications	Other processes		Printed publications	Other processes
Commissioner and Assistant Commissioner.....	2	1 492	Comparative Education Division.....	1	338
Consultants.....	11		Editorial Division.....	4	
Higher Education Division.....	9		Radio.....	2	
American School Systems Division.....	21		Forums.....	4	
Statistical Division.....	5		C. C. C.....	1	
Library.....	1		Vocational Education Division.....	8	
Library Service Division.....	3				
Special Problems Division.....	8		Grand total.....	80	
					1, 446

¹ Includes all regular divisions except vocational education.

The Office continued to issue a news letter, and five separate 4-page letters were sent out during the year. These letters in addition to their current information were utilized for announcements of the availability of new Office of Education publications.

DOCUMENTS DISTRIBUTED

Approximately 782,000 documents of the Office of Education were distributed during the year.

CORRESPONDENCE

The editorial division received during the year 46,666 communications in regard to publications. The incoming mail for the entire Office totaled 402,272.

EXHIBIT MATERIALS

Numerous exhibits of Office of Education publications have been developed for educational meetings throughout the country. These meetings included the National Education Association, the American Vocational Association, the American Library Association, and other major national conventions as well as State and local meetings.

Eight sets of colored stereopticon slides depicting curriculum activities and classroom equipment in nursery school, kindergarten, primary and upper elementary grades, and slides showing reproductions of report cards have been loaned during the past year in 12 States to superintendents, supervisors, principals, and instructors in teachers colleges and universities.

OTHER SERVICES

The various divisions of the Office reported more than 100 educational meetings throughout the country in which staff members officially participated. These meetings have included National, State, and local organizations. The Office's cooperation with professional and public service groups has touched practically every phase of educational interest.

Approximately 30 articles written by various staff members were published in educational journals in addition to articles written for School Life. Cooperation with newspapers and with other avenues for "promoting the cause of education" has been emphasized with good results during the year.

INTERNATIONAL RELATIONS

The Office of Education initiated correspondence with suitable persons and made nominations for delegates to the following meetings held the past year:

Second International Congress of the Anthropological and Ethnological Sciences, Copenhagen.

Tenth International Congress of Chemistry, Rome.

Ninth International Ornithological Congress, Rouen, France.

International Music Competition, Brussels, Belgium
 Third International Congress of Phonetic Sciences, Ghent
 Fourteenth International Conference on Documentation, Oxford, England.
 Ibero-American Literature Congress, Mexico City.
 Seventh International Conference on Public Instruction, Geneva.
 Fifth International Congress for the Deaf and Dumb, Paris.
 International Conference of Modern Language Professors, Paris.
 International Folklore Congress, Paris.
 International Congress of Aesthetics and Science of Art, Paris.
 Second International Congress for the Protection of Childhood, Rome.
 Fourth International Pediatric Congress, Rome.
 Thirteenth International Congress of Sociology, Paris.

Representatives of the Office attended various important meetings including those of the International Bureau of Education, the Inter-American Education Conference, and others.

Considerable correspondence was carried on with the Southern Association of Colleges and Secondary Schools in regard to accrediting American schools abroad. The Southern Association which has the responsibility for accrediting schools in the extraterritorial area including Mexico, West Indies, and South and Central America, is now taking steps to accredit schools in those areas.

The diplomatic offices in Washington both assist and ask assistance of the Office of Education. During the year official calls at the embassies and legations were made as follows: Czechoslovak, 3; Dominican, 2; Egyptian, 1; Greek, 7; Hungarian, 3; Latvian, 2; Turkish, 2; Union of South Africa, 1; and Yugoslav, 2.

ADMINISTRATIVE AND SUPERVISORY ACTIVITIES

LAND-GRANT COLLEGES AND UNIVERSITIES

For the year 1937-38, Federal appropriations to land-grant colleges and universities, for instruction, increased to \$4,530,000. These appropriations were \$4,030,000 last year. For 1938-39 and thereafter they will be \$5,030,000. Until 1935 the annual continuing appropriations amounted to \$2,550,000, all of which was made available through the second Morrill Act of 1890 and the Nelson amendment of 1907—\$50,000 to each State, Alaska, Hawaii, and Puerto Rico. The expenditures of these funds are supervised by the Department of the Interior, Office of Education.

In 1935 the Bankhead-Jones Act authorized to be appropriated annually supplemental funds allocated to the States and Hawaii on a population basis increasing for 4 years until the maximum is reached for 1938-39 and thereafter. These funds are contingent upon the approval of Congress annually.

Federal land-grant endowment funds are invested by the States locally and the income only from these funds is used for current expenses in the land-grant institutions. For the year ended June 30, 1937, the endowment principal amounted to \$25,038,609 not including

588,918 acres of unsold land valued at \$4,500,000. The income of the 1862 land-grant funds was \$939,678 from invested funds and \$69,895 from rentals, rights, and deferred payments. Other Federal land-grants amount to \$11,745,043 (principal) from which nearly a half million dollars in income was derived.

The 69 land-grant colleges and universities participating in these funds were created by the 1862 Act, 1 in each State (2 in Massachusetts) primarily or exclusively for white students, and 17 Negro colleges in as many Southern States. Because these institutions are tax supported and receive more than half of their income through governmental sources, tuitions and fees which all students pay are held at a minimum "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." About one-sixth of all students attending college in the United States register in the land-grant institutions.

The staff of these institutions numbered 24,464 men and 6,047 women in the 52 institutions for white students, and 622 men and 381 women in the 17 Negro colleges.

The total resident students in 52 institutions numbered 139,636 men and 56,579 women; in the 17 Negro colleges, 4,759 men and 5,506 women.

Of the total income of the land-grant colleges, 13 percent was derived from student fees, 3.5 percent from endowment funds, 56 percent from governmental sources, 3 percent private gifts, 6 percent sales and services, 14 percent from auxiliary enterprises, and the remainder from miscellaneous sources such as rent, interest, etc. The income was spent for the following purposes: General administration, 5 percent; resident instruction, 36 percent; organized research, 10 percent; extension service, 16 percent; libraries, 2 percent; operation and maintenance, 7 percent; a total of 76 percent for all educational and general purposes. Auxiliary enterprises and activities consumed 13 percent, noneducational expense 2 percent, and the remainder over 9 percent for capital outlays. The institutions paid 34 percent of all expenditures for administrative and instructional salaries and 13 percent for all other salaries and wages.

HOWARD UNIVERSITY

The inspection of Howard University required by law was made by the Office of Education and the report was compiled for presentation to Congress.

AMONG NEW DEVELOPMENTS

LIBRARY SERVICE DIVISION ESTABLISHED

Within the Office one new division, the Library Service Division, was organized. Its professional staff is composed of a chief of the Division, a specialist and an associate in school libraries, and a specialist in public libraries.

The functions of this new division include fact-finding, research, and experimentation in librarianship; fostering cooperation among libraries and between libraries and schools; and encouraging the further development of libraries throughout the country. The staff has proceeded along these lines in its initial efforts.

That such a division within the Office of Education will have an increasingly large area to cover is indicated by the fact that in the field of school libraries alone, 11 States now have State supervisors of school libraries and at least 13 other States have included supervisors of school libraries in their recent State plans. Twenty-one States and the District of Columbia now require certification of school librarians.

Furthermore, State appropriations for school library purposes have been greater than in the past and are stimulating efforts to raise standards, to improve the quality of personnel, of book selection, and of housing facilities. State aid has also brought about an expansion in county circulating school libraries.

The newly-organized division will seek to grow in service and to cooperate with States and local areas in their increasing efforts to make good library service available to all of the people.

CONFERENCES AND COOPERATION

Seeking information, cooperation, and helpful advice in various fields, the Office of Education during the year brought many educational leaders together in conference groups. Representative of such conferences were those devoted to the educational problems of residential schools for handicapped children; to the organization for clinical adjustment of behavior problems of school children; to problems of elementary education; and to school building problems.

The conference on educational problems of residential schools for handicapped children was a significant step in effecting a cooperative relationship between the Office and residential schools, many of which have no immediate connection with State departments of education. Administrators attending this conference urged that the Office of Education do what it can to secure the recognition of all institutions for handicapped children as schools rather than as correctional institutions. They also requested that field service and other assistance be furnished to them by the Office in the progressive development of their educational programs.

The conference on organization for clinical adjustment of behavior problems of school children was called primarily to explore some of the problems concerned with clinical organization, a study of which is under way in the Office.

The conference on problems of elementary education brought forth a discussion of the school curriculum, school organization, teacher preparation, home and public relations. The conference emphasized

the immediate need for studying the problems affecting the growth and development of children in elementary schools today.

The annual conference of the Office of Education and the National Advisory Council on School Building Problems was held in February, at which time the following research committees submitted reports of progress: National committees on (1) Developing within State Departments of Education a Division Supervising the Planning and Construction of School Plants, (2) Coordinating Relationships between State Planning Boards and State Departments of Education, (3) Uniform Methods of Reporting School Building Activities, (4) Evaluation of School Building Plans, (5) New Materials and Methods in Constructing School Buildings, (6) Federal Aid for School Buildings, (7) Minimum State School Building Requirements, and (8) School Building Costs and School Building Accounting.

Many other conferences were held throughout the year from which cooperation and specific contributions in various fields resulted.

ENCOURAGING ART

College art has been given encouragement during the year by the establishment of a college art section in the Fine Arts Gallery of the new building of the Department of the Interior.

The first exhibit in this gallery was opened to the public in November. It was an exhibition of oil paintings. Other exhibits have included architectural drawings and water colors, all the work of college students.

The gallery has been visited daily by artists and laymen. Visitors have come from practically every State and from several other countries.

MUSEUM OPENED

The Office of Education completed the basic material for its exhibit in the museum of the Department of the Interior building, and students of education and others have had access for several months to this exhibit. The various cases, 11 in all, depict progress in education throughout the United States and present both historical and current information in educational fields.

C. C. C. EDUCATIONAL ACTIVITIES

One of the major objectives of the Civilian Conservation Corps is to provide opportunities for vocational training and general education for the enrollees. Much personal development is carried on through the ordinary activities of camp life. From the regular hours, outdoor life, and good food the enrollee gains increased strength and sound habits of health and punctuality. From his daily work he gains useful skills and the knowledge that he is able to do a man's work in a man's world. From the fact that he is supporting himself and assisting his

family he gains self-respect and a sense of responsibility for those dependent on him. From association with his fellow enrollees and with the supervisory personnel he learns more of how to live among others and acquires respect for authority. Travel, contact with the forces of nature, and association with different types of people throughout the country likewise play important parts in arousing his ambition and developing his abilities.

In addition to these somewhat intangible and yet highly important values of camp life, organized educational opportunities are provided so that when the enrollees leave the Corps, they shall be more intelligent, self-supporting citizens in their home communities. These educational activities are carried on during leisure time without interference with the 40-hour work week and participation in the program is voluntary on the part of the men.

Under the plan for the educational program in the camps, the War Department is responsible for the administration of the program and its professional direction is a function of the Office of Education, which acts in an advisory capacity to the War Department. The technical services of the Departments of Interior and Agriculture assist in the program, particularly in the field of job training. Better coordination of the activities of the cooperating agencies was brought about during the past year by the reorganization of the C. C. C. Advisory Committee on Education in Washington.

GUIDANCE EMPHASIZED

Four years of experience with hundreds of thousands of C. C. C. men have assisted the camp personnel in forming a clearer concept of the type of education which is most appealing and most valuable to the camp members. In an average camp the members range in age from 17 to 23; in education, from illiterates to college graduates; in work experience, from no experience whatsoever to skilled tradesmen. Some of the men may be from farms or villages; the others of the group from small towns or large cities. In dealing with each enrollee, therefore, the program of education must be suited to his needs, interests, and abilities. These are ascertained by the educational adviser and other camp personnel through counseling with the individual men. During the past year camp officials report a total of 1,462,509 guidance interviews, or an average of 76 per company per month.

Approximately 3 percent of the men who arrive in camp are illiterate; 38 percent had not graduated from elementary school; 48 percent had not graduated from high school; and 11 percent had graduated from high school and were considered to be on the college level. Academic courses are provided for enrollees who wish to make up their school deficiencies or to secure graduation certificates. Thirty-

two percent of the men (83,029) participated in academic classes as compared with 34 percent during the previous year. Participation in these academic activities varied markedly on each educational level. Ninety-four percent of the illiterates attended literacy courses; 42 percent of those on the elementary level attended elementary courses; 28 percent of those on the high-school level attended high-school courses; and 6 percent of those on the college level attended college courses.

DIPLOMAS AWARDED

Arrangements were made by C. C. C. officials with many State and local school systems to award elementary, high-school, and college diplomas to enrollees who were able to qualify. As a consequence, during the year 3,517 enrollees received elementary school diplomas; 634 received high-school diplomas; and 13 were awarded college diplomas or degrees. Eight thousand eight hundred and seventeen illiterate enrollees were taught to read and write during the year. Moreover, in accordance with the congressional act of June 1937, 1,309 enrollees were granted leave of absence to attend schools and colleges. Forty-two colleges and universities offered more than a hundred scholarships to C. C. C. men during the year and 41 offered N. Y. A. aid and other miscellaneous types of assistance to enrollees desiring to attend college.

Vocational training is considered one of the major objectives of the program and 49 percent of the educational activities are classified as having vocational objectives. There are some 60 major types of work in which the C. C. C. is engaged, which may be broken down into more than 300 jobs for training purposes. Instruction on the job is combined with courses in related subjects during leisure time. During the year 54 percent of the men were receiving training of this kind in the jobs they performed while in camp as compared with 50 percent during the previous year. In addition to these job training activities, 41 percent of the men participated in other prevocational courses, which were provided in the camps or in nearby trade schools.

There is a variety of other educational activities carried on in the camps. For example, all camps give instruction in health, first aid, and safety. Officers, foremen, enrollees, and other instructors in many camps attend teacher-training, foreman-training, and leader-training courses. In the camp libraries there are now available more than 1,647,719 books. During the year 68,693 educational films were shown. Seventy-one percent of the companies publish a camp newspaper. During an average month about 8,500 lectures are delivered in the camps. Correspondence courses are provided either free or at reduced rates, and during an average month more than 16,000 enrollees take such courses.

An unusual feature of the program is the emphasis placed on the informal type of educational activities such as the arts, crafts, dramatics, music, hobbies, and debating and discussion groups. During an average month about 42,000 men (16 percent) engaged in these activities. Since participation in the educational program is voluntary, it must be made not only worth while but as interesting as possible.

C. C. C. officials have continued to assist the men in finding employment and adjusting themselves to their home community when they leave camp. This is done by providing courses in occupations and job-getting techniques and by counseling with individual men. In cooperation with other agencies, C. C. C. officials have assisted in organizing State guidance and placement councils. These State councils in turn have fostered the development of local community councils. In many States a referral card is sent to the local Employment Service office when enrollees return home. During the fiscal year 48,327 men were discharged from the corps to accept employment.

In summarizing the participation of the enrollees in the educational program, it may be stated that the average number of enrollees of the corps was 263,906 and the average regular attendance in organized educational activities was 229,253, or 86.9 percent. Figures computed from the monthly camp reports indicate that the average enrollee who participated in the program spent 5.8 hours per week in his educational activities as compared with 3.6 hours per week during the previous fiscal year.

During the year funds were authorized to provide space for educational purposes. Many companies constructed school buildings with 2,600 square feet of floor space. In other camps due to the fact that adequate space had already been provided or because enrollees were using the facilities of local schools, smaller buildings were constructed. A report from 8 of the 9 corps areas indicates that 842 camps now own motion-picture projectors and that all but 2 corps areas and district headquarters have established a film library service with suitable educational films.

The teaching staff in the C. C. C. educational program is drawn largely from the personnel of each camp. For example, during an average month of the year there were 23,168 persons teaching in the camps. Of this number 1,537 were educational advisers; 3,033 were Army officers; 9,895 were members of the technical services; 5,767 were enrollees; 1,344 were W. P. A. instructors; 123 were N. Y. A. students; 781 were teachers from the State and local school systems; and 688 were citizens of nearby communities.

Most of these instructors have a practical knowledge of the subjects they teach but some of them lack professional teaching techniques. Teacher training therefore has been carried on in many camps.

Through the cooperation of the vocational divisions of the State Departments of Education, teacher-training programs were conducted in all the camps of Massachusetts, Georgia, Michigan, and Wisconsin during the past year.

COOPERATION KEYNOTE

It is the policy of the corps to utilize whatever educational facilities are available in the States and local communities. The Works Progress Administration made available an average of 1,344 instructors per month and the National Youth Administration an additional 123. The State departments of education and local schools and colleges provided 781 instructors. The vocational divisions of the State departments of education in 20 States have assigned vocational instructors to the camps or have aided local schools in making their facilities available to enrollees.

Forty-seven colleges and universities offer correspondence courses to enrollees at reduced rates and an average of 16,164 men take these courses each month. Hundreds of schools and colleges have placed their facilities at the services of the enrollees and during the school year more than 6,500 enrollees attended schools and colleges adjacent to the camps. One State, Montana, has designated each C. C. C. camp as a technical high school for the accrediting of vocational training and related work.

The key to the development of the Civilian Conservation Corps thus far has been genuine cooperation. Its success has been due to a considerable extent to the teamwork of four departments of the Federal Government—Labor, War, Interior, and Agriculture. Its educational progress has been due not only to the work of these agencies but also to the cooperation of State, local, and private educational organizations, groups and individuals.

VOCATIONAL EDUCATION

The activities of the Office of Education in the fields of vocational education and vocational rehabilitation are carried on in pursuance of its responsibility for the administration of the following Federal acts:

The Vocational Education Act (Smith-Hughes), to provide for cooperation with the States in the promotion of vocational education. (Approved Feb. 23, 1917).

The Vocational Rehabilitation Act (Smith-Bankhead), to provide for the promotion of vocational rehabilitation of persons disabled in industry or otherwise, and their return to employment. (Approved June 2, 1920, as amended June 5, 1924, June 9, 1930, and June 30, 1932.)

An act extending the benefits of the Vocational Education and Vocational Rehabilitation Acts to the Territory of Hawaii. (Approved Mar. 10, 1924.)

An act to provide for vocational rehabilitation of disabled residents of the District of Columbia. (Approved Feb. 23, 1929.)

An act extending the benefits of the Vocational Education and Vocational Rehabilitation Acts to the Island of Puerto Rico. (Approved Mar. 3, 1931.)

An act (Social Security Act) authorizing additional appropriations for 1936 and 1937 and an annual appropriation thereafter for cooperation with the States and Hawaii in extending and strengthening their programs of vocational rehabilitation of the physically disabled. (Approved Aug. 14, 1935.)

An act (George-Deen) to provide for the further development of vocational education in the several States and Territories, authorizing for the year 1937-38 and annually thereafter, additional appropriations for vocational education in agriculture, trades and industries, home economics and the distributive occupations—and for teacher training in each of these fields. (Approved June 8, 1936.)

An act (Randolph-Sheppard) authorizing the operation of vending stands in Federal buildings by blind persons. (Approved June 30, 1936.)

Under these acts, the Office of Education cooperates with the public education systems in the States in promoting vocational education in agriculture, the trades and industries, home economics, and business education and in rehabilitating for self-supporting employment, persons who are disabled through accident, illness, or congenital causes.

The actual work of providing vocational education is carried on by the States, either directly through State boards for vocational education, or by the State board in cooperation with local cities and towns. Each State initiates and operates its own program. The Office operates no schools and employs no teachers or rehabilitation workers. The Office is administratively responsible for insuring the use of Federal funds for the purposes as set forth in the Federal legislation. Through its technical staff the Office of Education assists the States in the promotion and development of vocational education and vocational rehabilitation. The Office also conducts researches and studies and issues publications designed to assist those engaged in the vocational education and vocational rehabilitation programs in the States.

Before presenting in detail the principal activities of the Office of Education in the field of vocational education it may be well to enumerate some of the high lights of the vocational education and vocational rehabilitation programs which have emerged as a result of another year of effort. The factor which perhaps has had the greatest single influence upon and has given the greatest impetus to the vocational education program during the year has been the additional funds provided under the George-Deen Act, which was passed June 8, 1936, and which became operative July 1, 1937.

The acceptance of the act by the 48 States, the District of Columbia, and Puerto Rico, has placed additional responsibility upon the Office of Education. Staff members have been called upon to assist the States in drawing up plans covering the use of funds provided by the act and in putting into operation new types of training programs authorized by the act. Expansion under the act has taken place not only as an expansion of the program already in operation, but also as an extension of the program into areas which heretofore have not been able to support such a program. In two fields, moreover, public

service occupations and the distributive occupations, for which training is provided under the George-Deen Act, it has been necessary for the States to set up entirely new programs. Setting up a program of training for workers in the distributive occupations has been difficult because few of the States had previously carried on any activity in this field; and also because there were few trained persons who could be used immediately for supervisory and teaching services.

Evidence that vocational education programs are not being conducted on any hit-or-miss basis is to be found in the increasing demand for vocational education surveys in cities, districts, counties, and States. Office of Education staff members have in numerous instances been called upon to conduct or plan such surveys.

Special attention has been directed by the Office of Education during the year to assisting State boards for vocational education in setting up or modifying courses for prospective teachers of vocational education. There is a definite tendency in the States to lay greater emphasis on teacher-training programs. The increase in the number of prospective teachers enrolled in teacher-preparatory courses, and of teachers already in service enrolled for professional-improvement training, indicates that the attention given teacher-training programs is more than justified.

Encouraging is the tendency on the part of those responsible for vocational education programs in the States to broaden the scope of these programs so that they will include not merely training, but also the making of local surveys to determine the needs for specific programs and the opportunities open to those who pursue courses under this program; the placing of graduates from these courses; and following these graduates up in their employment and encouraging them to return to part-time classes for occupational improvement training.

ADVISORY BOARDS AND COMMITTEES

The value of advisory committees in setting up and operating programs of vocational education, particularly in the field of trade and industry, was recognized by the Federal Board for Vocational Education when it inaugurated the program of vocational education under Federal grants, in 1917.

The outline set up by the Office of Education to be followed by the States in formulating their plans for vocational education programs under Federal grants for the 5-year period, 1937-42, provides for the appointment of representative State Advisory Committees.

These State committees are of two types: (1) Committees designed to assist the State board for vocational education in the formulation of policies and to render a technical consulting service in connection with programs in all phases of vocational education; and (2) committees representing each of the major fields of vocational education, trade and industry, home economics, agriculture, and the distributive occu-

pations fields. A survey recently made by the Office of Education discloses that 21 States have general State advisory committees.

Thirty-nine States have set up advisory committees in the field of trade and industry. These trade and industrial advisory committees are composed of employers and workers. In addition a number of States have set up advisory committees for portions of a State, for counties, or for local communities.

Those committees in the field of trade and industry are usually of three general types: (1) The general advisory committee; (2) the industrial advisory committee; and (3) the craft advisory committee.

It has been found that committees are very helpful in advising on such training problems as: (1) The need for training in various fields of industry and the probable number to be served; (2) the type of training for journeymen, apprentices, or new workers; (3) the content of training courses; (4) the qualifications of instructors; (5) the plant and equipment needed; (6) plans for apprentice training; (7) giving the public a clear understanding of the training program; and (8) securing cooperation in the training program with the various agencies interested in vocational education for workers.

There has been a marked increase in the number of advisory committees in the field of trade and industry during recent years and this increase has been especially noticeable in the past year. The Office of Education follows as far as possible this practice of soliciting the assistance of committee groups in its administrative problems.

In June 1938, for instance, the Commissioner of Education called together in Washington a conference group composed of a State superintendent of schools, State directors of vocational education, State supervisors of distributive education, and representatives of the Department of Commerce, the retail trade, labor, and the field of business education.

This group rendered valuable service to the Office in setting up qualifications for State supervisors, teacher trainers, and teachers in the field of distributive education; in formulating a teacher-training program to be followed in that field; and in indicating the nature of a vocational education program for workers in this field.

Twenty-four States provide in their State plans for vocational education covering the period 1937-42 for a State home economics advisory committee to be set up at any time the need for such a committee arises.

The advisory committee idea has been put into operation by the States in the field of vocational rehabilitation through the organization of what is known as the State vocational rehabilitation council. This council is composed of the chief supervisory officer in each State and territory. It has an executive committee of nine members which is available to the Office of Education for advisory purposes.

STATE PLANS

Considerable attention has been given by the Office of Education during the year to assisting State boards for vocational education in formulating State plans for vocational education and vocational rehabilitation for the 5-year period, 1937-42. In some instances entirely new plans were prepared by the States. In many cases, however, the Office of Education was asked to approve an extension of old plans pending the preparation of new ones based upon changes in legislation and in economic and social conditions.

Although the general conditions applying to the use of Federal funds have remained the same since the passage of the Smith-Hughes Act in 1917, some new standards and types of vocational training were introduced by the passage of the George-Deen Act. It has been necessary for the States to take these new factors into consideration in setting up new plans.

Past experience in training programs in the field of trade and industrial education has shown that the best results are secured when training objectives are clearly defined and working objectives are carefully established. This fact as well as the realization on the part of the States of the necessity for setting up definite standards and safeguards for the various forms of trade and industrial education have caused them to proceed slowly and painstakingly in setting up their new 5-year plans.

The plans for trade and industrial education have taken into account particularly: Higher standards for teachers; training for public service occupations; maintenance of adequate safeguards in connection with plans for cooperative training to prevent charges that vocational training is being employed as "a device for utilizing the services of vocational trainees for private profit"; cooperative efforts to promote apprenticeship and to organize related training for apprentices; local supervision of training programs; and coordination of the training given in classes with actual work in industry.

The provisions embodied in the 5-year plans for the promotion of agricultural education by the States show that the additional funds provided for this phase of vocational education under the George-Deen Act are to be used to expand and strengthen programs already in existence and to initiate programs in new centers and new fields of activity. In using these funds, particular attention will be given to programs of training for farm youth who have left school and are not yet established in any type of profitable farming.

State plans for programs of home economics education submitted to the Office of Education have placed particular stress upon the development of State programs of research; summer employment for teachers to enable them to supervise home projects; State and local advisory committees in home economics education; and the introduc-

tion of apprentice teaching into home economics teacher-training courses.

The fiscal year marked the inauguration of programs of training in part-time and evening classes for those engaged in the distributive occupations. State plans covering this field of vocational education and which would serve as a basis for initiating the distributive education program were approved by the Office of Education for 1 year only.

On the basis of the first year's experience these 1-year plans have been or are now being revised to provide, among other things, for State supervision of distributive education programs, preemployment and in-service training for teachers of distributive occupations courses, and part-time and evening classes for distributive workers. A significant feature of all State plans is the requirement that supervisors, teacher trainers, and teachers shall have had successful experience in the distributive occupations they are employed to teach, and that the class instruction offered shall be supplemental to and based upon the job activities of the worker.

Regional rehabilitation agents of the Office of Education have rendered extensive service to State rehabilitation division staffs in preparing and providing for improvements in their 5-year plans for administration of rehabilitation programs. A number of States have made changes in their plans based upon the findings of surveys of vocational rehabilitation programs made by the Office of Education in cooperation with State rehabilitation divisions during the past 3 years.

ENROLLMENTS INCREASED

The enrollment for the year ended June 30, 1937, in vocational schools organized under State plans, in agriculture, trade and industry, home economics, and the distributive occupations was 1,506,824, which was 125,123 greater than the enrollment for the preceding year. Indications are that the record for the fiscal year just closed will reveal a sizable increase in enrollments over 1937.

Preliminary estimates indicate that more than 1,000 new all-day vocational agriculture departments were established in public high schools during the year ended June 30, 1938; that approximately 50,000 out-of-school farm youth were receiving instruction in part-time classes; and that 150,000 adult farmers were enrolled in evening classes.

A definite improvement is noticeable, also, in the type and scope of the instruction in agricultural education. Increased emphasis has been placed upon supervised farm practice, required of every person enrolling for a course in vocational agriculture, which is worked out on a comprehensive long-time basis and is based on the problems and conditions facing the individual student.

Although there has been a gradual growth in the enrollment in trade classes for several years, the principal increases during the past year have taken place in classes organized for training in public service occupations and those organized for employed workers, especially apprentices.

In conformance with the terms of the George-Deen Act, practically all of the States have been initiating during the year a training program for workers in the distributive occupations. Instead of seeking to organize numerous classes with a large enrollment, however, State boards for vocational education have been giving major attention to the development of a sound and constructive training program.

Classes have been organized for store workers, managers, and owners. The instruction in these classes has emphasized sound management policies for owners and executives of distributive businesses and a knowledge of merchandise and efficient customer service for store workers.

Distributive workers and executives are already recognizing the value of this training to the producer, the distributor, and the consumer. State and national associations are cooperating in the development of the program. With the present impetus it is expected that a carefully conceived and well-developed program will be put in operation in all the States during the current fiscal year.

During the former fiscal year 11,091 disabled persons were rehabilitated; that is, restored as far as possible physically and placed in self-supporting employment; and it is expected that the number for 1938 will be larger.

Small as is the percentage increase in the number rehabilitated each year under the Federal-State cooperative program of rehabilitation, it represents a significant accomplishment in view of the facts: (1) That vocational rehabilitation must be done on an individual rather than on a mass basis, and (2) that employment conditions have been so stringent that even many able-bodied persons have experienced difficulty in securing employment.

Rehabilitation programs are now in operation in 46 States, the District of Columbia, Puerto Rico, and Hawaii. A total of 326 persons is employed on the staffs of State rehabilitation services and rehabilitation offices are maintained in 169 cities.

COOPERATIVE SERVICES

Cooperative services to the States is a principal function of the Office of Education in the field of vocational education. In addition to the more or less routine service involved in auditing State vocational education and vocational rehabilitation expenditures of Federal monies, inspecting vocational schools and classes, and conferring with State vocational education officials on administrative problems, members of the staff of the Office render many other services.

They cooperate in planning and setting up training courses for prospective vocational education teachers; assist in local, district, and State surveys and investigations on the need for vocational education programs; assist in planning and improving curricula in different fields of vocational education; plan and have charge of annual State and regional conferences for directors, supervisors, coordinators, and teacher trainers and other vocational education and vocational rehabilitation workers; participate in institutes and courses for teachers of vocational education; assist in activities in behalf of the blind; assist in training rehabilitation case workers; and assist in various activities carried on by emergency and recovery organizations.

IN AGRICULTURAL EDUCATION

The agricultural education service of the Office of Education has devoted considerable time during the year to assisting State directors of vocational education and State supervisors of agricultural education in formulating their 5-year plans for vocational education in agriculture so that they would be in keeping with the vocational education acts and the policies of the Office of Education.

Regional conferences for State supervisors and teacher trainers in agricultural education have been held in each of the four regions. In addition a conference for State supervisors and Negro teacher trainers from the 18 States which maintain separate schools for this race, was held in Washington, D. C. State and district conferences also have been held for teachers and supervisors of agriculture in the various States.

Special attention has been directed to the promotion and improvement of programs of vocational education in agriculture for out-of-school farm youth and adults. This phase of vocational agriculture was stressed in 39 district conferences for teachers of vocational agriculture from 12 States; in summer sessions attended by teachers of agriculture where short, intensive courses dealing with problems of part-time and evening school instruction have been discussed; and in State conferences for vocational agriculture teachers. Approximately 1,500 teachers have been reached through these various services.

Expansion of the program of vocational agriculture into many rural communities has created an unusual demand for qualified teachers. Teacher-training institutions have been encouraged to adjust their programs to meet this demand, with the result that in practically all of the States the teachers needed to staff new departments and to replace persons leaving the field of vocational teaching are being prepared. At the request of State vocational officials and colleges, surveys have been made or assistance given by Office of Education representatives in connection with specific teacher-training problems.

The Office of Education continued to sponsor the activities of the Future Farmers of America—the national organization of boys studying vocational agriculture in the rural high schools. At the close of the year there were 5,000 local chapters of this organization in 47 States, Hawaii, and Puerto Rico, with a total membership of approximately 160,000.

Counterpart of the Future Farmers of America is the organization for Negro vocational agriculture students known as the New Farmers of America, or the N. F. A., which has a membership of more than 12,000 in 340 chapters. Through the Office of Education the new N. F. A. Guide was published and made available during the year to members of this organization.

IN TRADE AND INDUSTRIAL EDUCATION

Nine outstanding services to the States are reported by the trade and industrial education service of the Office for the past year. Representatives of the service assisted in or made surveys of school districts, cities, counties, or States designed to ascertain the possibilities for trade and industrial education. They made studies of single trades or groups of trades or of industries to discover the needs for organized vocational training in these trades. They made studies of vocational schools and classes to evaluate specific features of the work being done and to discover ways of improving it; and conducted or assisted in conducting training courses for trade and industrial teachers, supervisors, and coordinators of trade and industrial education.

State conferences were held by staff members of the Office of Education for teachers, supervisors, and coordinators of trade and industrial education as well as training conferences for foremen and executives of industrial plants, and training courses for foremen conference leaders. Continuing its practice of previous years, the Office has made analyses of the training content of a number of additional trades. Finally, representatives of the Office of Education have conferred with executive officers and State directors of vocational education from time to time during the year on special problems arising in the promotion of vocational education programs.

IN HOME ECONOMICS EDUCATION

Special attention has been given by the home economics service of the Office of Education in its program of cooperation with the States, to long-time planning for the further development and strengthening of home economics education. Emphasis has been placed on this type of planning not only in the annual regional conferences but in four intraregional conferences of supervisors and teacher trainers in home economics education.

Among specific services rendered by the home economics education service are included: Assistance in State conferences of home eco-

nomies teachers in 7 States; teaching short units of instruction on special problems in summer schools for home economics teachers conducted in 6 institutions; cooperating with State supervisors of home economics education in making studies of teacher education programs in 15 institutions; directing a 5-week training program for itinerant teacher trainers for Negro schools; guiding curriculum studies in education for home and family life in 16 States; assisting in setting-up programs of research in home economics education in 9 States; and assistance to supervisors of home economics in several cities in developing broadened programs in family life education.

IN BUSINESS EDUCATION

In the main, the cooperative services of the Office of Education to the States in the field of business education have consisted of assistance in the formulation and revision of State plans covering training for the distributive occupations; and in the preparation of instructional material for distributive workers who are members of organized classes.

As examples of the type of services rendered to groups in the States in the field of business education may be mentioned assistance to the chairman of a committee on commercial education curriculum for small rural high schools in one State; counsel and suggestions given to a State official in another State on the formulation of a curriculum for a part-time program of training in the retail field; and assistance to the chairman of a curriculum committee in a third State on the revision of curricula for business education in the high schools of the State.

IN REHABILITATION

Throughout the year four regional and two special agents of the Vocational Rehabilitation Division of the Office of Education were engaged in rendering a varied type of service to State boards for vocational education and their representatives. These services included assistance in: (1) training new personnel, (2) planning better procedures for handling rehabilitation cases, (3) developing more effective administrative organizations, (4) improving cooperative working relations with private agencies and other State agencies, and (5) making surveys of State programs of vocational rehabilitation and formulating recommendations for improvement in these programs, based upon the survey findings.

COOPERATION WITH OTHER AGENCIES

In its role as administrator of the vocational education acts the Office of Education endeavors to cooperate in every way possible not only with State boards for vocational education, but also with other Government agencies; with trade and professional and other groups;

and with individuals interested in agricultural, trade and industrial, home economics, and business education.

This cooperation has taken various forms. It has included cooperation in planning vocational and special courses; in preparing publications on various subjects for use by workers in the field of vocational education and vocational rehabilitation; in preparing and presenting radio programs; in convention and conference activities; in research activities; and in providing services supplementary to those available through the vocational education and vocational rehabilitation programs.

During the past year, the Office has definitely cooperated with at least seven different United States bureaus or divisions.

It has cooperated with the Agricultural Adjustment Administration in the preparation of subject matter on the activities of that organization for the use of supervisors, teacher trainers, and teachers of vocational agriculture in explaining these activities to farm youth and adult farmers; and in providing for discussion of the agricultural adjustment program by representatives of the Agricultural Adjustment Administration, at conferences of agricultural teachers.

Early in 1938, a committee consisting of educators in the fields of agriculture and home economics, was appointed by the Commissioner of Education to formulate a cooperative agreement between the Office of Education and the Extension Service of the Department of Agriculture, under which both bureaus might render greater service to farm people. This inter-departmental group is at work on this agreement which will cover relationships between those engaged in agricultural and home economics extension work and those engaged in agricultural and home economics education in the various States.

The agricultural service of the Office of Education assisted during the year in working out with the Soil Conservation Service of the Department of Agriculture, suggested subject-matter material for the use of agricultural teachers in giving instruction in soil conservation. This cooperation has resulted also in the setting up of a definite plan for cooperation in two North Central States between the Soil Conservation Service and agricultural supervisors and teachers.

As a result of the cooperation in various ways between the Office of Education and the Farm Credit Administration, many agricultural students and adult farmers have secured loans to assist them in becoming established in farming. The Office has also cooperated with the Farm Credit Administration in preparing publications on farm credit for the use of vocational agriculture teachers.

Through the joint cooperation of State supervisors of agricultural education and State directors of the National Youth Administration, special types of part-time classes in vocational agriculture for out-of-school farm boys have been held at colleges of agriculture in two

western States; special farm shops have been erected and equipped; and where facilities were available for 6 months of supervised practice in farming, a teacher of vocational agriculture has been provided to teach part-time classes.

In a number of instances, new school buildings provided through the Works Progress Administration have included housing space for departments of vocational agriculture.

The Office of Education has cooperated, also, in the program of the Civilian Conservation Corps, as explained specifically in a previous section of this report, as well as with the Rural Electrification Administration and the Farm Security Administration.

Assistance was given the Federal Bureau of Investigation of the Department of Justice by a member of the Office of Education staff in organizing and conducting training groups of men selected from State and local police departments in law-enforcement activities, so that they may be able to instruct other officers in their State or local police departments.

Special analyses were made by a representative of the Office of Education of the jobs performed by stewards, bakers, cooks, and custodial officers in Federal prisons, to be used by the Federal Bureau of Prisons as a basis for training courses for these groups of employees.

Cooperating with the Navy Department, the Office of Education has completed preliminary work involved in setting up an in-service training program for the Department's civilian employees, and in training younger employees in the drafting department of one of the principal Navy yards.

Plans are being formulated by the Office for setting up a training course for field employees of a number of bureaus of the Department of Agriculture.

The Office of Education has cooperated with the Federal Fire Council in inspection and interdepartmental activities; with the Social Security Board in its employee-training activities; with the Works Progress Administration in trade analysis and foreman conference work; with the Council of Personnel Administration through an interchange of informative material; and with the International Association of Fire Chiefs in training work for fire fighters.

Cooperative work with other agencies in the field of home economics education has included: A joint study with the home economics extension service of the Department of Agriculture on the present status and needs for home economics education in two selected counties; assistance to the Interdepartmental Committee of the Federal Government in coordinating health and welfare activities; participation in conferences having a bearing on home economics education sponsored by the Children's Bureau, Department of Labor, American Home Economics Association, American Vocational Asso-

ciation, National Congress of Parents and Teachers, National Council of Parent Education, National Education Association, Association of Southern Agricultural Workers, National Consumer-Retailer Relations Council, and National Committee on Household Employment; and cooperation in various ways with the Farm Credit Administration, Federal Housing Administration, National Youth Administration, Tennessee Valley Authority, Rural Electrification Administration, and Works Progress Administration.

Cooperation with Government and other agencies in the field of business education has consisted of furnishing information to trade associations relating to the program of distributive education authorized by the George-Deen Act. Included in the organizations to which such information has been given are: American Retail Federation, National Retail Dry Goods Association, Retail Druggists' Association, Industrial Retail Stores, Bureau of Foreign and Domestic Commerce of the Department of Commerce, and the Consumer Distribution Corporation. Advice and assistance have been given to regional and national associations of business educators in planning convention and conference programs and in the preparation of publications.

Various Federal acts having to do with vocational rehabilitation either directly or indirectly require cooperation between State rehabilitation and other departments such as workmen's compensation, public employment, and crippled children's agencies. Much of the time of Federal rehabilitation agents during the year was devoted to promoting effective working relationships among such departments.

Ever since the Civilian Conservation Corps was organized, the Office of Education has rendered assistance in the program of education for C. C. C. enrollees. This assistance has continued throughout the past year.

APPRENTICE TRAINING

As increased attention is given by employers and by workers to the development of apprenticeship, the special functions of vocational education are more clearly recognized.

Two distinct groups of responsibilities and functions in the promotion and operation of plans for apprentice training are recognized by the Office of Education and the Department of Labor.

One group of responsibilities has to do with the apprentice as an employed worker—the conditions under which he works, his hours of work, his pay rates, the length of his learning period, and the ratio of apprentices to journeymen maintained for the purpose of avoiding overcrowding or shortage of skilled workers in the trades. These responsibilities, the Office of Education and the United States Department of Labor agree should be carried by State labor departments whose function it is to improve working conditions and foster the well-being of workers.

The second of the two groups of responsibilities and functions has to do with the instructional phases of apprenticeship. Included in this category are: Analyses of trades for the purpose of learning the training content; planning of courses to meet the needs of workers; organization of related subjects classes; training teachers for such classes; and any other functions involved in giving the apprentice technical and supplemental instruction needed to make him a proficient worker and to coordinate his instruction and his job experience. These educational functions, the Office of Education and the Department of Labor believe belong to those who are responsible for vocational education in the States.

In a number of States, special supervisors of apprentice education have been appointed and many representative advisory committees have been organized. In all cases, the school administration and the members of State advisory committees in trade and industrial education are urged to cooperate with the United States Department of Labor and State labor departments in upholding labor standards.

Special attention has been given by the Office of Education in cooperation with the States to the preparation of instructional material which may be used in apprentice classes.

RESEARCH ACTIVITIES

The research program of the Office of Education in the various fields of vocational education has been extended during the year.

Among the subjects on which studies have been made are the following: Agricultural experiment station data and their use in vocational agriculture classes; supervised farm practice; occupations of out-of-school farm youth; potential departments of vocational agriculture; factors influencing the establishment in farming of former vocational agriculture students; teacher-training programs in agriculture; cooperative study with American Vocational Association of vocational education needs in Williamsport, Pa.; size of program for agricultural education in various regions; salaries of vocational agriculture teachers, 1936-37; vocational training for sheet metal workers in the aviation industry; household service workers' training courses; apprenticeship in the plumbing trades; training for fire fighters in Connecticut; training programs for plasterers, machinists, and bricklayers; teacher training in the field of trade and industrial education; membership and functions of representative trade and industrial advisory committees; training for police service; training for public service occupations; employment status of trade school graduates; aeronautic engineering courses; studies and research in home economics and home economics education in colleges and universities; training needed by research workers in home economics; methods of teaching home economics; educational programs in home and family living at high-school and college levels; source units in housing and

household management in secondary school programs; responsibilities of household employees for which training is needed; teaching of textile and clothing courses in high schools and implications for the college program; administration of State vocational rehabilitation programs; rating system for the evaluation of case work in rehabilitation; mental, achievement, aptitude, interest, and other tests for use in rehabilitation case work; analysis of data on rehabilitated cases.

Besides carrying on its own program of research in vocational education and vocational rehabilitation, the Office of Education has through its staff members rendered considerable assistance to the States in setting up programs of research. In addition, requests for assistance in research activities in States where special research workers have been employed have been met by aiding research groups in each State to study the local needs for research with special consideration for their national implications; helping set up plans for a long-time program of research in the State; and evaluating accomplishments during the first year in order that plans covering the next steps in the research program in the State may be appropriately revised.

Limited personnel has prevented the carrying on of a comprehensive research program in the field of business education. Data were collected on curriculum building in business education, including distributive education, teacher training, State and local supervision; and on distributive occupations. Assistance has been given to research workers in the States carrying on studies in curriculum revision, teacher training, occupational surveys, job analysis, and methods of teaching business subjects.

NEW DEVELOPMENTS

The completion of the first year of the operation of the George-Deen Act has served to emphasize some of the new developments as well as the outstanding needs of the vocational education program.

One of the principal developments made possible by the provisions of the act was the organization of training on a much broader basis than had hitherto been possible for persons already employed in public-service occupations.

Another development made possible is the wider use of local supervision of vocational education programs, particularly in training on the job of teachers of trade and industrial education, drawn from industry.

By reason of the fact that it authorizes the payment of travel expenses of advisory committee members, also, the George-Deen law has made possible more effective utilization of advisory committees, especially in the field of trade and industrial education.

A significant increase in the number of all-day, part-time, and evening schools has been made possible through the additional funds.

In the field of agricultural education the act made possible the employment of an increased number of teachers on a full-time basis. As a result a greater number of these teachers are able to give their time exclusively to agricultural instruction and to include in their activities the organization and teaching of part-time classes for out-of-school youth and evening classes for adult farmers, instead of being required to prorate their time between agriculture and other subjects taught in the high school. This has encouraged the raising of standards in agricultural teacher-training institutions.

The vocational training programs for distributive workers represent one of the significant developments in the field of vocational education during the year. The year's record indicates that there is widespread interest in this type of vocational education and that the possibilities for expanding the training program are almost unlimited.

There is an imperative need for occupational surveys, follow-up studies, and revision of business curricula based on the findings of research. Business teacher-training curricula in colleges and universities need to be revised in accordance with modern requirements.

APPROPRIATIONS: 1938 AND 1939

The total amount appropriated for administering the vocational education program carried on under the Smith-Hughes and George-Deen Acts for the year ending June 30, 1938, was \$425,000. The appropriation for the fiscal year ended June 30, 1939, for this purpose is in the same amount.

The appropriation for administering the Federal vocational rehabilitation acts was increased from \$95,000 for the fiscal year ended June 30, 1938, to \$104,650 for the year ending June 30, 1939.

The Smith-Hughes Act appropriates \$7,167,000 annually for allotment to the States for cooperative vocational education in agriculture, trades, and industries, and teacher training. The total amount authorized by the George-Deen Act to be appropriated annually for vocational education is \$14,483,000. An appropriation of the full authorization was made for the fiscal year 1938. An amount of \$12,500,000 was appropriated for 1939 with the provision that the allotments to the States shall be computed on the basis of the total amount authorized in the act. Appropriations for vocational education in Hawaii and Puerto Rico are continued for 1939 in the same amounts appropriated to these territories in 1938—\$30,000 and \$105,000, respectively.

The Federal appropriation to the States for vocational rehabilitation under the Smith-Bankhead Act of 1920, as amended, for each of the years ending June 30, 1938, and June 30, 1939, was \$1,800,000, with the provision that the allotments to the States shall be computed on the basis of the total amount authorized in the act. The appropriations for vocational rehabilitation for Hawaii, Puerto Rico, and the

District of Columbia, \$5,000, \$15,000, and \$25,000, respectively, for 1939 are the same as those for 1938.

The acts authorizing appropriations for allotment to the States for vocational education and rehabilitation provide that unexpended balances remaining in the States at the close of a fiscal year shall be deducted from the allotments to those States for the ensuing year. As already indicated, appropriations made in consideration of the unexpended balances provide that the allotments to the States shall be made on the basis of the total amounts authorized in the acts.

Appropriations for allotment to the States and Territories are shown in table I, total allotments to the States and Territories for vocational education in table II, and allotments for vocational rehabilitation in table III.

TABLE 1.—Appropriations for Allotment to the States and Territories for Vocational Education and Vocational Rehabilitation, 1938, 1939

Act	Appropriation	
	Fiscal year ended June 1938	Fiscal year ending June 1939
VOCATIONAL EDUCATION		
Smith Hughes Act:		
Total.....	¹ \$7, 167, 000	¹ \$7, 167, 000
Vocational agriculture.....	3, 027, 000	3, 027, 000
Vocational trade, industry, and home economics.....	3, 050, 000	3, 050, 000
Vocational teacher training.....	1, 090, 000	1, 090, 000
George-Deen Act:		
Total.....	14, 483, 000	² 12, 500, 000
Vocational agriculture.....	4, 067, 200	3, 529, 300
Vocational trade and industry.....	4, 058, 975	3, 503, 200
Vocational home economics.....	4, 048, 825	3, 494, 500
Distributive occupations.....	1, 254, 000	954, 000
Vocational teacher training.....	1, 054, 000	1, 019, 000
An act making appropriations for the Territory of Hawaii:		
Total.....	30, 000	30, 000
Vocational agriculture.....	10, 000	10, 000
Vocational trade, industry, and home economics.....	10, 000	10, 000
Vocational teacher training.....	10, 000	10, 000
An act making appropriations for the Island of Puerto Rico:		
Total.....	105, 000	105, 000
Vocational agriculture.....	30, 000	30, 000
Vocational trade and industry.....	30, 000	30, 000
Vocational home economics.....	30, 000	30, 000
Vocational teacher training.....	15, 000	15, 000
VOCATIONAL REHABILITATION		
Vocational Rehabilitation Act.....	³ 1, 800, 000	³ 1, 800, 000
Hawaii.....	5, 000	5, 000
Puerto Rico.....	15, 000	15, 000
District of Columbia.....	25, 000	25, 000
Total vocational rehabilitation.....	1, 845, 000	1, 845, 000
Total vocational education and vocational rehabilitation.....	23, 630, 000	21, 647, 000

¹ Permanent and continuing appropriation. Estimated expenditure, \$7,000,000.

² Allotments to States made on basis of \$14,483,000 as authorized in the act.

³ Allotments to States made on basis of \$1,938,000 as authorized in the act.

TABLE 2.—Allotments of Federal Money to the States and Territories for Vocational Education, Year Ending June 30, 1939

State or Territory	Smith-Hughes Act (appropriated)			George-Deen Act (authorized to be appropriated)					
	Total	Vocational agricultural education	Vocational trade, industrial, and home-economics education	Vocational teacher training	Total	Vocational agricultural education	Vocational trade, industrial, and home-economics education	Vocational education for distributive occupations	Vocational teacher training
Total.....	\$7,157,977.62	\$3,018,853.83	\$3,049,265.27	\$1,089,858.52	\$14,483,000.00	\$4,067,200.00	\$4,048,825.00	\$1,254,000.00	\$1,054,000.00
Alabama.....	160,268.82	106,018.23	32,611.15	21,639.44	401,144.05	165,947.24	135,856.98	24,429.46	19,837.46
Arizona.....	35,926.19	15,926.19	10,000.00	10,000.00	80,400.60	20,000.00	20,000.00	10,000.00	10,000.00
Arkansas.....	113,969.95	82,028.87	16,776.23	15,164.85	305,740.84	138,607.14	105,115.82	17,120.09	13,902.02
California.....	313,296.41	84,540.06	182,301.71	46,425.18	493,373.58	76,828.34	108,333.79	52,410.87	42,559.21
Colorado.....	61,536.56	28,757.35	22,709.21	10,000.00	123,622.04	35,018.40	213,243.37	10,000.00	10,000.00
Connecticut.....	89,214.52	26,484.45	49,589.77	13,140.30	144,923.17	20,000.00	64,104.14	14,834.50	12,046.06
Delaware.....	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	10,000.00	10,000.00
Florida.....	84,785.54	39,488.86	33,290.52	12,006.16	159,855.59	34,542.21	50,149.93	13,554.13	11,006.36
Georgia.....	175,228.68	112,207.67	39,236.98	23,784.03	430,909.73	173,631.20	62,833.09	143,788.43	26,850.55
I Idaho.....	37,587.72	11,587.72	10,000.00	10,000.00	83,800.29	23,322.53	20,000.00	22,537.76	10,000.00
Illinois.....	420,524.11	111,199.48	240,935.06	62,398.95	673,513.00	123,722.64	279,646.92	70,444.17	57,202.79
Indiana.....	185,584.34	80,412.77	78,089.02	26,482.55	360,165.48	100,062.97	102,283.38	103,044.87	29,397.00
Iowa.....	146,260.73	83,146.09	42,908.77	20,205.87	331,923.17	121,080.05	49,491.33	22,811.05	18,323.26
Kansas.....	111,527.42	64,167.23	31,978.49	15,381.69	250,754.04	87,361.92	49,439.38	17,364.88	14,100.81
Kentucky.....	157,532.30	101,201.53	35,010.22	21,380.55	379,737.33	145,672.06	60,643.33	129,684.62	24,137.19
Louisiana.....	124,390.87	70,683.15	36,522.14	17,185.58	282,172.30	102,842.00	53,597.61	19,401.35	15,754.48
Maine.....	50,615.30	26,528.15	14,087.15	10,000.00	101,582.84	21,171.85	58,788.05	19,401.35	10,000.00
Maryland.....	92,659.43	36,602.80	42,714.98	13,341.65	162,385.90	29,400.76	46,994.63	15,061.81	12,230.65
Massachusetts.....	225,939.31	23,310.27	167,878.22	34,750.82	459,102.70	96,872.60	174,008.92	39,231.31	31,857.00
Michigan.....	270,137.03	85,855.27	144,684.11	39,597.65	594,996.48	110,858.20	110,019.17	44,703.06	36,300.23
Minnesota.....	148,887.03	72,816.70	55,103.85	20,966.48	317,424.54	110,858.20	70,365.18	19,401.35	15,754.48
Mississippi.....	124,424.02	93,141.81	14,847.09	16,435.12	349,001.51	168,741.26	27,283.12	119,356.49	15,066.51
Missouri.....	209,813.81	98,675.62	81,459.38	29,678.81	431,203.86	137,990.54	106,052.83	33,505.35	27,207.35
Montana.....	39,875.61	19,875.61	10,000.00	10,000.00	90,801.51	25,331.93	25,469.58	10,000.00	10,000.00
Nebraska.....	82,280.54	49,713.06	21,299.32	11,268.16	192,684.27	72,518.94	33,409.76	12,720.99	10,329.82
Nevada.....	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	10,000.00	10,000.00
New Hampshire.....	32,679.49	10,714.23	11,965.26	10,000.00	80,000.00	20,000.00	20,000.00	10,000.00	10,000.00
New Jersey.....	218,495.63	39,135.29	146,312.71	33,047.63	302,649.11	20,000.00	164,895.07	37,308.52	30,295.64
New Mexico.....	37,642.12	17,642.12	10,000.00	10,000.00	82,697.48	20,000.00	22,607.48	10,000.00	10,000.00
New York.....	679,136.35	115,167.53	461,031.10	102,937.72	947,775.59	89,138.46	500,480.36	116,209.68	94,365.76
North Carolina.....	192,981.96	131,572.98	35,484.35	23,924.63	483,934.01	198,094.85	168,604.08	29,267.15	23,765.80
North Dakota.....	51,635.26	31,635.26	10,000.00	10,000.00	129,730.19	49,191.21	40,538.98	10,000.00	10,000.00

¹ The allotments to Hawaii and Puerto Rico are not included in the totals under the Smith-Hughes Act.

² The sum of \$12,500,000 was appropriated for the fiscal year 1939, with the proviso that the allotment to the States and Territories be made on the basis of \$14,483,000, the full amount authorized.

TABLE 2.—Allotments of Federal Money to the States and Territories for Vocational Education, Year Ending June 30, 1939—Continued

State or Territory	Smith-Hughes Act (appropriated)				George-Deen Act (authorized to be appropriated)				
	Total	Vocational agricultural education	Vocational trade, industrial, and home-economics education	Vocational teacher training	Total	Vocational agricultural education	Vocational trade, industrial, and home-economics education	Vocational education for distributive occupations	Vocational teacher training
Ohio.....	\$371,096.69	\$119,248.45	\$197,495.50	\$54,352.74	\$627,015.40	\$125,453.59	\$237,563.83	\$152,810.82	\$19,826.61
Oklahoma.....	143,352.81	87,756.55	36,002.87	19,593.39	337,188.90	126,795.87	57,856.10	112,455.55	17,961.78
Oregon.....	57,324.88	25,866.11	21,488.77	10,000.00	111,628.76	27,693.47	30,789.18	33,146.11	10,000.00
Pennsylvania.....	537,709.58	172,677.04	286,273.09	78,759.45	835,491.92	106,072.11	370,028.00	221,276.85	38,914.06
Rhode Island.....	47,842.03	10,000.00	27,842.03	10,000.00	88,296.97	20,000.00	28,296.97	20,000.00	10,000.00
South Carolina.....	106,714.19	76,236.31	16,236.29	14,218.59	274,928.97	113,473.43	34,676.21	97,692.95	13,034.56
South Dakota.....	51,323.28	31,323.28	10,000.00	10,000.00	128,452.67	48,313.48	20,000.00	40,139.19	10,000.00
Tennessee.....	156,555.22	95,875.76	39,282.82	21,390.64	376,206.74	150,491.95	50,084.68	122,859.89	19,614.87
Texas.....	343,814.26	191,491.24	104,391.96	47,631.06	786,504.42	291,248.04	146,433.22	215,386.28	43,664.66
Utah.....	35,132.76	13,466.11	11,666.65	10,000.00	80,900.00	20,000.00	20,000.00	20,000.00	10,000.00
Vermont.....	33,424.97	13,424.97	10,000.00	10,000.00	80,900.00	20,000.00	20,000.00	20,000.00	10,000.00
Virginia.....	145,433.63	91,206.99	34,419.18	19,804.46	337,148.87	117,718.58	62,036.16	116,880.97	18,155.27
Washington.....	80,331.85	37,840.25	38,737.07	12,784.52	165,452.09	37,731.20	53,077.76	48,490.36	11,719.91
West Virginia.....	104,697.06	68,990.85	21,535.80	14,140.41	226,923.60	55,607.33	53,981.55	88,408.27	12,932.89
Wisconsin.....	169,327.36	77,210.55	68,033.37	24,033.44	343,977.87	109,088.25	86,784.01	98,941.39	22,032.10
Wyoming.....	30,000.00	10,000.00	10,000.00	10,000.00	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00
Alaska.....	-----	-----	-----	-----	80,000.00	20,000.00	20,000.00	20,000.00	10,000.00
District of Columbia.....	-----	-----	-----	-----	80,512.97	20,000.00	20,512.97	20,000.00	10,000.00
Hawaii.....	-----	-----	-----	-----	80,020.99	20,020.99	20,000.00	20,000.00	10,000.00
Puerto Rico.....	-----	-----	-----	-----	254,271.99	126,739.41	21,941.06	79,764.66	11,573.86

TABLE 3.—Allotments of Federal Money to the States and Territories for Vocational Rehabilitation, Fiscal Years Ending June 30, 1938 and 1939

State or Territory	1939	State or Territory	1939
Total.....	\$1,938,000.00	Nevada.....	\$10,000.00
Alabama.....	40,912.77	New Hampshire.....	10,000.00
Arizona.....	10,000.00	New Jersey.....	62,481.73
Arkansas.....	28,671.54	New Mexico.....	10,000.00
California.....	87,774.11	New York.....	194,619.94
Colorado.....	16,014.92	North Carolina.....	49,014.59
Connecticut.....	24,843.80	North Dakota.....	10,526.32
Delaware.....	10,000.00	Ohio.....	102,762.39
Florida.....	22,639.53	Oklahoma.....	37,044.38
Georgia.....	44,967.45	Oregon.....	14,746.17
Idaho.....	10,000.00	Pennsylvania.....	148,907.13
Illinois.....	117,975.03	Rhode Island.....	10,629.16
Indiana.....	50,069.43	South Carolina.....	26,882.47
Iowa.....	38,202.37	South Dakota.....	10,711.91
Kansas.....	29,081.51	Tennessee.....	40,453.71
Kentucky.....	40,423.30	Texas.....	90,054.00
Louisiana.....	32,492.04	Utah.....	10,000.00
Maine.....	12,328.69	Vermont.....	10,000.00
Maryland.....	25,224.49	Virginia.....	37,443.44
Massachusetts.....	65,701.88	Washington.....	24,171.15
Michigan.....	74,865.59	West Virginia.....	26,734.67
Minnesota.....	39,640.43	Wisconsin.....	45,439.00
Mississippi.....	31,073.18	Wyoming.....	10,000.00
Missouri.....	56,112.45	Hawaii.....	10,000.00
Montana.....	10,000.00	District of Columbia.....	25,000.00
Nebraska.....	21,304.23	Puerto Rico.....	15,000.00

¹ A special allotment of \$5,000⁰⁰ to Hawaii and the allotments to the District of Columbia and the island of Puerto Rico are not included in the total.

OFFICE OF EDUCATION PUBLICATIONS, 1937-38

GENERAL EDUCATION

Bulletins 1937

No.

2. Volume I: Biennial survey of education, 1934-36.

Chapter

III. Higher education, 1930-1936.

IV. Adult education.

VI. Effects of the depression upon public elementary and secondary schools and upon colleges and universities.

VII. A survey of a decennium of education in countries other than the United States.

VIII. A review of educational legislation, 1935 and 1936.

X. Development in educational method, 1934-36.

2. Volume II:

Chapter

II. Statistics of State school systems, 1935-36.

III. Statistics of city school systems, 1935-36.

IV. Statistics of higher education, 1935-36.

V. Statistics of public-school libraries, 1934-35.

VI. Statistics of special schools and classes for exceptional children.

3. Public affairs pamphlets. Supplement 1.

9. College salaries, 1936.

10. Economic status of college alumni.

11. College student mortality.

12. Some factors in the adjustment of college students.

13. Economic status of rural teachers.

14. Successful practices in teaching English to bilingual children in Hawaii.

No.

15. Learning English incidentally: A study of bilingual children.
16. Student interests and needs in hygiene.
18. Preparation for elementary school supervision.
19. CCC camp education: Guidance and recreational phases.
20. Education and the Civil Service in New York City.
21. University unit costs.
23. Professional library education.
24. Continuity of college attendance.
25. Forums for young people.
26. Education in the southern mountains.
27. Printed page and the public platform.
28. Needed research in secondary education.
30. Occupational experiences for handicapped adolescents in day schools.
31. A survey of courses of study and other curriculum materials published since 1934.
Preprint of Part IV. A classified list of courses of study, 1934-1937.
32. Let Freedom Ring! 13 scripts.
33. Let Freedom Ring! Manuel.
34. Industrial arts—Its interpretation in American schools.
35. School building situation and needs.
36. Guidance bibliography: 1935.
37. Guidance bibliography: 1936.
38. Vocational education and guidance of Negroes.

Bulletins 1938

1. Educational directory, 1938.
Part
 - I. State and county school officers.
 - II. City school officers.
 - III. Colleges and universities.
 - IV. Educational associations and directories.
2. The school custodian.
3. Nature and use of cumulative records.
4. School use of visual aids.
5. Bibliography of research studies in education, 1936-37.
6. Offerings and registrations in high-school subjects, 1933-34.
7. Curriculum laboratories and divisions.
8. The elementary school principalship.
9. College projects for aiding students.
10. Local school unit organization in 10 States.
11. Principles and procedures in the organization of satisfactory local school units.
12. Development of State programs for the certification of teachers.

Miscellany

1. Choosing our way.
2. To promote the cause of education.

Pamphlets

79. Legislative plans for financing public education.
81. Per capita costs in city school systems, 1936-37.
82. Physical education in institutions of higher education.
83. Handbook for compiling age-grade progress statistics.
84. Safety and sanitation in institutions of higher education.
85. Salary and education of rural school personnel—status and trends.

Leaflets

No.

- 30. Federal aid for education, 1935-36 and 1936-37.
- 31. Government publications useful to geography teachers.
- 32. Personnel and financial statistics of school organizations serving rural children, 1933-34.
- 33. The housing and equipment of school libraries.

Bibliographies

- 24. Transportation of pupils at public expense. Revised.
- 27. Consolidation of schools and reorganization of school administrative units. Revised.
- 28. Education and social change. Revised.
- 32. Visual aids in education: Motion pictures. Revised.
- 54. Supervised correspondence study in high schools.
- 55. Conservation education in secondary schools.
- 56. Educating for international understanding.
- 57. The county superintendent and the administration of rural schools.
- 70. Conservation education in elementary schools.
- 71. Conservation of trees and forests, for use in elementary schools.
- 72. Conservation of birds, animals, and wild flowers, for use in elementary schools.

VOCATIONAL EDUCATION

Agricultural Education

- Bulletin No. 189. Landscaping the farmstead—Making the farm home grounds more attractive.
- Bulletin No. 196. Farm forestry—Organized teaching material. Timber farming including woods management and forest tree planting.
- Leaflet No. 2. Suggestions for teaching the job of controlling bunt (stinking smut) of wheat in vocational agriculture classes. Revised.

Home Economics Education

- Bulletin No. 194. The duties and responsibilities of the general household employee. Some bases for determining content for vocational courses in household employment.
- Bulletin No. 195. Homemaking education programs for adults. A guide in the development of adult education in home economics.

Trade and Industrial Education

- Bulletin No. 192. Training for the public-service occupations.
- Bulletin No. 193. Training for the painting and decorating trade.

Vocational Rehabilitation

- Bulletin No. 113. Administration of vocational rehabilitation. Revised.

General

- Digest of annual reports of State boards for vocational education to the Office of Education, Vocational Division, fiscal year ended June 30, 1937.

RECOMMENDATIONS

On the previous pages is given an account of the work done by the Office of Education. What is left undone by the Office, what the rich possibilities for additional services are, stand out in my mind

in contrast with the relatively meager, although I trust effective, services now being rendered. I wish, therefore, to include in these recommendations brief statements of what I think the Office of Education should be equipped to do which it cannot now do.

I. SERVICES CALLING FOR FEDERAL LEGISLATION.

A. THE PRESIDENT'S ADVISORY COMMITTEE ON EDUCATION.

This committee submitted a report in March, 1938. That report analyzes admirably the general problem of the Federal relations to education. With the spirit and the general findings of that report, I am in agreement. It recognizes an expanding responsibility of the Federal Government in the field of education. It selects the areas of education in which the Federal Government should participate and sets forth the reasons why the development of each of these areas is a matter of national concern.

The committee recommends that the Office of Education should have large responsibility for the administration of the proposed laws. Therefore, it is appropriate to name these important areas of education and to summarize in a few words the reasons why legislation, framed in accordance with the most satisfactory formulas for Federal-State relations that can be evolved and designed to carry out the Advisory Committee's general purposes, should be passed.

1. *Federal equalization fund.*—The equalization of educational opportunity among the States for elementary and secondary school pupils should no longer be neglected. Equality of opportunity is the most basic tenet of democracy. Furthermore, national welfare demands that the weaker schools be strengthened. A low standard of education in one community affects adversely all communities.

2. *Teacher training.*—No school program can be strong unless the teachers are well trained. Therefore, the Federal Government, when it contributes funds for education in the States, must take steps to assure highly trained teachers for the schools.

3. *School buildings to assist in meeting the expense of better district organization.*—Schools have been established in many States under the small district system. Small school districts were well adapted to earlier years, in fact they were necessary then, but today they are inefficient and often too expensive. The most common feature in this district system is a small and unsatisfactory building in each district. In many cases the perpetuation of an outworn district organization plan is due to the expense involved in providing modern school buildings and facilities. Therefore, the Federal Government can materially assist in remedying the existing situation by stimulating a school building program that will enable many communities to bring about an efficient scheme of district organization.

4. *Assistance to State departments of education.*—With the passing years, more and more responsibility for an effective system of educa-

tion in the several States is falling upon State departments of education. The planning of courses of study, the certification of teachers, and many other responsibilities which were formerly carried by the local districts, are now handled by State departments of education. An increasingly large share of the funds for the support of schools is being collected and distributed on a State rather than on a local district basis.

Many State departments are not adequately equipped to administer their already heavy duties. If Federal funds are made available to the States it is important that provision also be made to assist State departments of education in carrying their ever-enlarging responsibilities.

5. *Bridging the gap between school and job.*—The responsibility of the public for the welfare and training of a youth does not end when he chooses to leave the public school. A prolonged gap between school and job may nullify much of the good which accrues from attending school. The public should continue its interest in a young person at least until he is placed in a suitable occupation where he can be self-sustaining.

Therefore, to organize and coordinate all educational services available for young people in each community, so that each youth will be guided into the type of activity best suited to him, is an urgent public duty. This service for youth is bound to be intimately related to organized education. The administration of the program should be integrated with the administration of education.

6. *Adult education.*—Nearly half the adult population of today never completed the elementary school. Furthermore, with the rapidly increasing complexity of social life, even an adequate education in one's youth no longer suffices for adult life. An adult education program is among the most urgently needed safeguards of democracy. The Federal Government should help to stimulate it.

7. *Rural library service.*—Rural people in general are out of reach of the public libraries which serve (although only partially) the urban population. But because of their greater isolation from social opportunities, rural people are in at least as great need of library service as are urban people. Therefore, the Federal Government may properly stimulate the States to develop a library service which reaches the rural population.

8. *Education of children living on Government property.*—There are at the present time some thousands of children living in Federal areas scattered throughout the country who do not have educational opportunities, or who secure them through the payment of tuition. The parents of these children are in most cases Federal employees who are assigned to live in these territories.

In recent years the number and types of federally owned or controlled reservations have greatly increased, thus removing taxable wealth from local school districts. In some cases no school facilities exist. In others the existing local facilities are entirely inadequate to care for the increased numbers of children who move into the territory by reason of the newly developed Federal activity. Year after year these thousands of children continue without educational opportunities. It is exceedingly important that as soon as possible the Federal Government establish some policy which will guarantee adequate educational opportunities for the children who must reside on these Federal properties.

9. *Educational research, planning, and leadership.*—In countries having strongly centralized governments, education is a function of those governments. Large authority resides in the ministries of education. Changes in the programs of the schools and colleges can be effected quickly by edicts issued by those ministries. In the United States the opposite system prevails and should be continued. Education is a function of the several States and local communities. The Federal Government has little authority. Coordination of programs among the States is accomplished by voluntary counsel and cooperation. Under these conditions, change usually takes place slowly. A long time often elapses before the best practices of one locality or State are accepted in other localities or States.

While such a system is relatively safe against partisanship propaganda, it lacks the machinery to keep education abreast of other social and economic movements, especially those movements motivated by profits. A democracy, if it is to be successful in its competition with strong centralized governments, must provide itself with machinery to facilitate the social changes which depend upon voluntary acceptance by the people. The mainspring of that machinery is a research program adequate to discover and verify better educational policies and practices year after year. Well organized demonstrations involve phases of practical research which may be of far-reaching significance.

Operating with the research program must be adequate facilities for counselling and planning in order to assure the most economical and effective utilization of the results of research.

These two functions, research and planning, together with promotion of an understanding of the findings of the former and of the purposes and results of planning and demonstrations respectively, are the primary purposes of the Office of Education. If the Office can be adequately equipped to perform these functions, the United States need not concentrate in the Federal Government administrative control of education in the States, and yet we may be assured of quicker adjustments of the educational systems to the needs of the times.

B. OTHER FEDERAL LEGISLATION NEEDED.

1. *Public forums*.—A special aspect of adult education which demands consideration at this time, is the forum for the discussion of current social, economic, and political questions. Democracy can rise no higher than the level of the public opinion of its voters. To enlighten that public opinion is a necessary safeguard of democracy.

The present agricultural, industrial and social programs of the Federal and State Governments, together with many other issues of common concern, involve policies which demand wide information and free discussion. A vital method of spreading accurate information among adults is the public forum, controlled by the local public educational agencies. Experience gained during the past 3 years with forum demonstrations carried on in many communities in 40 States and sponsored by the Office of Education with emergency funds, has demonstrated not only their effectiveness, but their freedom from partisan bias. Provision should now be made for extending these experimental forum centers more widely throughout the States by the use of regular funds instead of relief funds.

There should be appropriated a sum, which need not be very large in comparison with other Federal grants in aid to the States, from which each State would receive an allotment for each of 3 years on a basis of matching which would be readily acceptable to the States and local communities. It is estimated that such a 3-year program in grants in aid as suggested would create an adult civic education enterprise within each State under local management involving in all States approximately 500 full-time forum leaders or their equivalent. That number of leaders would be capable of conducting almost 100,000 public forums per year in addition to giving many other types of assistance to local programs of civic education for adults. Such an investment would make public discussion of the crucial problems of democracy sufficiently general and vital to the life of our people that the principles and procedures of democratic discussion would simultaneously become effective safeguards of the democratic processes over all parts of the Nation. The principles and procedures of democratic discussion and fair examination of controversial issues would influence general public education and would serve to promote a surer foundation for the further development of democracy through our present 3 billion dollar expenditure for education. At the conclusion of the 3-year period consideration should be given to the desirable next steps to be taken.

This proposal suggests a way by which the vital sources of democratic power may be nurtured by the application of the educative processes to local public opinion formulation. The forum is, therefore, not merely a desirable advance to make in the field of public education but it is also in the nature of a national necessity made so by the

burdens now being heaped upon public opinion by modern social and economic problems. It is recommended as a basic means of making democracy work and as a practical method of preventing the development of any potential tendencies toward dictatorship.

2. *Physically handicapped children*.—Because of the special facilities needed, one of the most expensive phases of education in any local community is the proper education of physically handicapped children. On this account and also because the number of children so handicapped in any community is, in proportion to the total school population, relatively small, there is totally inadequate provision in many States and communities for the education of these children.

The Government has made provision for the physical and educational rehabilitation of disabled adults. Under the Social Security Act, provision is also made for the physical rehabilitation of crippled children. Thus far no Federal assistance has been provided for the education of physically handicapped children. Legislation should, therefore, be passed that will provide the social security for handicapped children which is possible only through their proper education. The Federal Government should, through grants-in-aid to the States, stimulate a Nation-wide development of educational opportunities for physically handicapped children.

II. SERVICES WHICH CALL FOR ADDITIONAL APPROPRIATIONS TO THE OFFICE OF EDUCATION BUT WHICH DO NOT REQUIRE FEDERAL LEGISLATION.

Many of the services suggested above under "Research, Planning, and Leadership" could be rendered without new Federal legislation if the Office were adequately staffed for the purpose. Some of the more urgent needs for such additional services will be briefly mentioned below.

A. TO PROMOTE BETTER GENERAL EDUCATION THROUGHOUT THE STATES.

There are many ways in which the Office of Education is called upon to help the States in their efforts to provide general education. Among these are the following:

1. *General curriculum problems*.—One of the most difficult and important problems involved in the proper development of education is to be found in the need for a constant revision of the curriculum. Innumerable problems involving the curriculum are constantly presented to the Office of Education but because of a serious lack of of personnel and facilities, it is not possible for the Office to render the services requested. A few of the principal types of services which the Office should be in a position to render to States and local school systems, to professional workers in the field of education, and the growing number of institutions and civic organizations interested in education, are the following:

(a) Analysis and interpretation of current economic and social conditions having significance for curriculum workers throughout the Nation.

(b) Evaluation and interpretation of significant revisions of curricula and methods of instruction.

(c) Stimulation and coordination of experimental undertakings looking toward evaluation of various curricular organizations and teaching procedures.

(d) Collection, evaluation, and listing of courses of study and supplementary curriculum materials; establishment of a curriculum laboratory.

(e) Consultation service on the curriculum, especially with State departments of education.

(f) Curriculum conferences; reporting their results.

(g) Preparation, publication, and distribution of fundamental studies concerning curricula, of descriptive accounts of outstanding curriculum practices, and of bibliographies.

For the reasons indicated, a well-equipped curriculum division dealing with the various subject-matter fields and educational activities on the several levels of the school course extending from the nursery school through the university into adult life, should be established in the Office and supported by an appropriation commensurate with the needs.

2. *School building problems.*—Every year this country spends many millions of dollars in constructing school buildings. Several millions of dollars could be saved by the States and local communities each year if a more extensive technical information service on school building problems could be made available through the Office of Education. School building surveys and planning the modern school plant involve highly complex problems. The solutions to these problems require the expert services of a large number of technicians; that is, school superintendents, economists, sociologists, State and district planning experts, school building architects, landscape architects, heating, ventilating, illuminating, and sanitary engineers, statisticians and experts in finance and accounting. There is a vast amount of valuable technical information on school building problems but usually much of this information is not available except to large city school systems. Such information should be available through the Office of Education. It is obvious that the present staff of school building experts in the Office of Education, consisting of only one person, is entirely inadequate to serve the needs of the States and innumerable urban and county school systems.

3. *Educational administration.*—The whole field of organized education may be divided into two large areas, the one having to do with the curriculum and instructional techniques and the other one deal-

ing with organization, administration, and supervision. While school building problems are generally classified in the area of administration, the previous section dealt specifically with the need for Office assistance in connection with school buildings because services related to school-house construction and school building surveys are of unusual importance as a basis for the wise use of the many millions of dollars annually expended on school buildings by the Federal Government, the States, and the local communities.

But apart from the problems of school buildings there is a veritable maze of intricate administrative problems which require constant study if systems of education are to be kept up to date and made efficient. These administrative problems involve questions of support, taxation, finance, educational legislation, personnel, pupil accounting, organization of boards of education, of administrative and supervisory staffs and of school schedules in various types of school systems in rural areas, small urban communities, large cities, counties, regions within States, and the State as a whole. The requests which annually come to the Office of Education for assistance to States and local communities in connection with the vital problems of administration are so numerous that it is impossible for the Office to give the kind of help requested in more than a relatively small number of cases. There is great need for additional appropriations to the Office for the purpose of providing adequate service in this broad field of administration.

B. TO PROMOTE BETTER SOCIAL, ECONOMIC, AND CIVIC EDUCATION.

The development of better machines for industry is stimulated by the profit motive. What is to be done with workmen who are thrown out of work by the machines is a problem the solution of which is not stimulated by the profit motive. Yet public welfare is threatened by the slowness with which this and similar problems are solved.

While industry may be expected to subsidize those sciences which are basic to industrial development, government must see to it that development in the social, economic, and civic phases of life keeps pace with the industrial developments of this machine age.

The following recommendations are to be regarded as supplementary to the one presented previously under the heading, "General curriculum problems."

1. *The social sciences.*—Better social science work in the schools and colleges is the first and most urgent need. Competent staff members to aid the States and local communities in improving the instruction in these studies should be available in the Office of Education.

2. *Crime prevention.*—One of the most disconcerting phenomena of this period is the increase of crime, particularly among youth. Much could be done in the field of crime prevention through education if

there were staff members available in the Office of Education to assist in developing the plans for such education.

3. *Safety education*.—The appalling toll of lives sacrificed and injuries sustained each year by accidents in this country is a sad reminder of our negligence of one phase of social education. Cities with adequate safety education programs have strikingly cut down their accident rates. Surely the Office of Education should be in a position to stimulate the speedy adoption in all communities of programs of education which have been found to be effective for accident prevention in some communities.

4. *Conservation education*.—A keynote of the present policy of the Government is conservation, but the development of this policy is slowed up in its operation if not actually threatened by general lack of understanding among the people of the needs of conservation of natural resources. The problem is essentially one of education. The Office of Education should be in a position through a small staff to advise curriculum workers throughout the country with respect to ways in which the teaching of conservation may be infused into various aspects of the school programs in the different levels of education.

5. *Recreation*.—Good habits and skills in sports and other forms of recreation should be widely developed. Many persons would enjoy sports, hobbies, and other leisure-time activities, if they but knew how to participate in them. There is no one in the Office of Education at the present time whose primary interest is in education for recreation. This need in the Office should be met.

6. *Creative arts*.—Work today offers to many workers little or no opportunity for the expression of their creative impulses. But to many men and women there is no satisfaction so keen as the joy of creating something. To devise ways by which each person can learn to do well some of the creative arts which may occupy his leisure or help him in his chosen occupation, is one of the challenges to education today. The Office of Education should be in position to help to develop and to spread such a program of training in the creative arts. With the exception of one person in the field of industrial arts, there are no professional workers in the Office whose primary interests and abilities are in the general field of creative arts. If this country is to develop an appreciation of the beautiful and the means of giving beauty the practical expression which should characterize an advancing civilization, education must assume vigorous leadership in creating the essential appreciations and artistic skills. To do its part in the development of such a Nation-wide appreciation of the arts, the Office should be provided a staff of competent persons trained in art, music, dramatic art, and creative writing.

C. TO DISCOVER AND PROMOTE THE PROPER EDUCATIONAL USE OF
MOTION PICTURES AND RADIO.

The chief aids to education in the past have been the teacher's voice and the printed page. Visual materials such as maps, charts, and pictures, have supplemented these, but have played a minor role. Laboratories and field trips have been available to a limited extent. But in recent years two new aids with incalculable potentialities have become available, the motion picture and the radio. No one at present will attempt to prophesy how powerful they may become. It is certain that their influence is already great, even though they have found their way into the schools only to a small extent.

During the period when the proper place and function of these new aids to education are being determined, the Office of Education should be in a position to assist in the research and experimentation necessary to find the truth about their proper use. And the Office should be equipped to carry the responsibility for a major portion of the Federal Government's educational broadcasting. There is no provision in the Office of Education at the present time for a service in the field of visual education. There is only one professional position provided for in the regular appropriations to give assistance in the field of radio.

D. TO STRENGTHEN EDUCATIONAL RESEARCH BY A SYSTEM OF COOPERATIVE FELLOWSHIPS

The Office of Education is to a large extent a fact-finding and fact-disseminating agency. In its fact-finding activities it cooperates with many research agencies. It stimulates many investigations. It offers its facilities, so far as possible, to other investigators. It advises institutions and individuals with respect to research projects.

Graduate students in education are frequently engaged in less significant investigations than they would like to be identified with because these students do not have access to materials with which to conduct more significant investigations. The Office of Education, on the other hand, is greatly limited in its ability to carry on research because it lacks competent, trained people in various research fields.

It would be mutually advantageous, therefore, for certain selected students in graduate schools of education to conduct their investigations in cooperation with the Office of Education. In several fields, at least, better training in research techniques could be given them than is afforded in some graduate schools of education. More valuable results would accrue from their investigations. The research program of the Office of Education would be greatly speeded up if these students could be selected by the Office and assigned by their universities to carry on the investigations required by their universities in cooperation with the Office of Education. A small appropria-

tion should be made to the Office of Education to enable it to secure the services of research fellows.

In all the recommendations included herewith there have been few arguments presented in their defense. Proper arguments would require space far beyond the limits allowed for this report.

May I be permitted to state, however, that apart from these proposals based upon the report of the President's Advisory Committee on Education, the other recommendations rest in the main upon a series of many conferences held in the Office of Education in 1936. These conferences were organized around different subjects such as the curriculum, school buildings, the creative arts, and the like. Each was participated in by about 12 leaders, representing diverse agencies and interests in the particular field which was the subject of the conference.

At the conclusion of a 2- or 3-day session each conference group submitted a report to the Commissioner of Education giving the views of the conferees concerning the services which the Office of Education should be staffed to render in the particular field. These conference reports are available to substantiate the recommendations presented.

GENERAL EDUCATION BOARD

The General Education Board, which has as its object the promotion of education within the United States, was created by an act of Congress approved January 12, 1903. Section 6 of this act requires the Corporation to file annually with the Secretary of the Interior a report in writing, stating in detail the property, real and personal, held by the Corporation, and the expenditure or other use or disposition of the same or the income thereof during the preceding year.

On December 31, 1936, principal fund, belonging without restriction to the Board, amounted to \$38,916,046.24. Transactions during the year ended December 31, 1937, resulted in a net decrease of \$2,582,881.56., or a balance on December 31, 1937, of \$36,333,164.68. This fund is invested in stocks and bonds. In addition, the sum of \$11,230,886.33 has been reserved out of principal, of which \$10,230,886.33 is reserved to pay appropriations to various educational institutions, while the remaining \$1,000,000 has been referred to the executive committee for appropriation. This fund is invested as follows: Securities \$10,513,470.45, and cash on deposit \$717,415.88. Lapses on prior years' appropriations amounted to \$1,638. Payments during the year amounted to \$6,652,417.77.

The income from the above funds, together with income from undistributed income, amounted during the year to \$2,017,775.66; the balance of income from the previous year as of December 31, 1936, amounted to \$8,232,488.88, which, together with sundry refunds amounting to \$3,343.25, increase the total to \$10,253,607.79. Disbursements from income during the year amounted to \$3,352,539.40, leaving an undistributed balance of income on December 31, 1937, of \$6,901,068.39. Of this sum \$5,560,669.45 is invested in securities; \$674,641.68 in cash on deposit; and \$665,757.26 representing the net sum of advances, deferred charges, and sundry accounts receivable under appropriations, which are to be accounted for. This balance of \$6,901,068.39 consists of: Unpaid appropriations \$5,849,548.64; amounts reserved for unappropriated authorizations \$208,761; and the sum of \$842,758.75 which remains unappropriated.

There was appropriated from income during the year the sum of \$2,786,137.74. Lapses on account of prior years' appropriations amounted to \$458,799.07, however, leaving a net increase in income appropriations of \$2,327,338.67.

The Anna T. Jeanes fund, the principal and interest of which are to be used for Negro rural schools, amounted, on December 31, 1936, to \$15,919.21. This sum was appropriated during the year and added to the sum of \$12,500 remaining unpaid at December 31, 1936, resulting in a total sum appropriated of \$28,419.21. Payments during the year amounted to \$20,919.21, leaving the sum of \$7,500 unpaid at December 31, 1937. This amount was in cash on deposit.

The balance in the Anna T. Jeanes fund income account at December 31, 1936, amounted to \$1,223.50, which consisted of unpaid appropriations of \$875, and an unappropriated balance of \$348.50. During the year this balance (\$348.50) was appropriated, and the entire fund, amounting to \$1,223.50 was disbursed.

DIVISION OF INVESTIGATIONS

B. B. Smith, *Director*

THE annual appropriation for the Division of Investigations for the purpose of investigating official matters under the control of the Department of the Interior for the fiscal year 1938 was \$436,100. The sum of \$50,750 emergency funds was also allocated for investigative work pertaining to emergency projects.

The number of special agents employed in the Division as of June 30, 1938, was 79, of which number 69 were regular special agents and 10 were paid from emergency funds. In addition to the special agents there were five special agents in charge directing the special agents, under the supervision of the director, at offices maintained at San Francisco, Calif.; Billings, Mont.; Salt Lake City, Utah; Albuquerque, N. Mex.; and Washington, D. C. The total force employed, including the director, assistant director, reviewer and clerks, was 125.

Requests for investigations during the past fiscal year, originating in the various bureaus and offices and affecting practically every activity of the Department, showed a marked increase over those of the preceding year. On June 30, 1937, there were 9,897 cases pending; 11,054 cases were received during the year; 9,037 were investigated; and 11,914 uninvestigated cases were pending on June 30, 1938.

The most important work, both from a standpoint of volume and the necessity for prompt action, arose under section 15 of the Taylor Grazing Act. A total of 4,100 applications for lease were investigated and reported during the fiscal year. In these cases the special agents determined the qualifications of the applicants, the carrying capacity of the lands, the number of head of livestock which such lands would support each year, and the rental fees. In addition numerous other minor factors were determined, such as the need of the lands for stock driveway purposes or, if they contained permanent water, the desirability of having them set aside as public water holes. A number of cases were complex because of the large number of conflicting applications, but in most instances the special agents were successful in bringing about compromises between the applicants.

Field examinations were also made under section 7 of the Taylor Grazing Act which provides for classification of lands within and without grazing districts which are suitable for other than grazing

purposes. Field examinations were also made under section 8 of the same act which provides for the exchange of State owned or privately owned lands. Field investigations were made to determine whether the lands involved in these exchanges were of equal value and area, and also whether the question of public watering places was involved.

Section 14 of the above-mentioned act liberalized the previous provisions of law with respect to purchases of isolated tracts of lands, with the result that these cases necessitated field examinations for the purpose of appraisal.

Notwithstanding the generally accepted belief that the withdrawal of public lands from homestead entry has lightened the burden of the Division of Investigations with regard to homestead cases, the work remains at about the same figure. On July 1, 1937, there were 2,399 homestead cases pending investigation; during the fiscal year ended July 1, 1938, 1,473 cases were received and 1,513 cases investigated; leaving a total of 2,359 pending investigation. The large number of homestead entries to be investigated is due principally to the regulation of grazing on public lands which has given rise to complaints of livestock operators who previously have been inclined to adopt a passive attitude toward fraudulent entries involving lands upon which grazing was not regulated. Also, it is apparent that many homestead claimants who formerly renewed their entries under the provisions of the act of September 5, 1914, but who are now prevented from making such renewals by the Executive withdrawal of November 26, 1934, are inclined to attempt final proof on their entries rather than allow them to be canceled or relinquished upon the expiration of the statutory period allowed for compliance with homestead requirements.

During the last fiscal year a considerable number of cases were handled for the Bureau of Reclamation, such as the examination of lands claimed to be valuable for minerals, including the appraisal of patented lands, as well as unpatented mining claims, involved in new reclamation projects. Cases of this nature have been handled and are pending in connection with the Central Valley project in California. A reappraisal of land under the Boise, Idaho, project was made. Test runs for gold placer gravels on approximately 1,200 acres were made on the area to be partially flooded by the Caballo Reservoir, near Hatch, N. Mex.; as a result there was a reduction in the claim of property owners for damage which would be caused by flooding of the property from \$200,000 to approximately \$36,000.

A total of 95 cases involving coal, timber, and grazing trespasses were investigated during the year. As a result of these investigations \$141,991.46 were recovered for the Government. In one case which involved a coal trespass, \$133,114.74 was collected under a judgment in the Federal court.

The following criminal and penal code violations were investigated during the fiscal year ended June 30, 1938:

Embezzlement.....	4
Fraud, sale of oil and homestead land.....	1
Fraud, acquisition, public land.....	1
Perjury.....	2
Grazing trespass.....	8
Bribery.....	2
Impersonation of Federal officers.....	2
Fraud.....	1

Eleven persons were indicted during the year and eight were convicted. One defendant was sentenced to a term of 6 to 12 years and fined \$36,000. Nine criminal cases are pending action.

A number of hearings based upon investigations and reports submitted by the investigators were conducted in behalf of the United States by the special agents who have charge of hearings, resulting in the restoration to the public domain of thousands of acres of land in cases where fraudulent final proofs were attempted and the law not complied with.

Special agent auditors made all the audits of Indian agencies and guardianships, as well as the audits of concessionaires operating under contracts in the various national parks and national monuments. Typical of other important types of accounting performed by this Division was the audit of the sales of potash from Government leased lands to determine the amounts due in royalties.

Official conduct and personnel cases were investigated under authority of the Secretary of the Interior, and investigations were made involving applications to practice before the Department.

PETROLEUM CONSERVATION DIVISION

George W. Holland, *Director*

THE PETROLEUM CONSERVATION DIVISION was established to assist the Secretary of the Interior in administering the act of February 22, 1935 (49 Stat. 30), as extended by the act of June 14, 1937 (50 Stat. 257); to cooperate with the Interstate Oil Compact Commission and the oil- and gas-producing States in the prevention of waste in oil and gas production and in the adoption of uniform oil- and gas-conservation laws and regulations; and to keep informed currently as to the movement of petroleum and petroleum products in interstate commerce and undue burdens or restrictions thereof which may be caused, in whole or in part, by lack of parity between the supply of and consumptive demand for petroleum and petroleum products, in the event that such facts may be required by the President for the exercise of his responsibility under section 4 of said act. The establishment of this Division was authorized by Executive Order No. 7756, dated December 1, 1937.

The act of February 22, 1935, generally known as the Connally law, regulates interstate and foreign commerce in petroleum and petroleum products by prohibiting the shipment in such commerce of petroleum and its products produced in violation of State law. It was to have expired June 16, 1937, but was extended to June 30, 1939, by the act of June 14, 1937. By Executive Order No. 7756, dated December 1, 1937, the Secretary of the Interior was designated by the President to execute during the extended period certain powers and functions vested in the President by the law, and Executive Orders Nos. 7757 and 7758 of December 1, 1937, were issued for the administration of the law, as extended. By Executive Order No. 7759, dated December 1, 1937, the President revoked Executive Order No. 7024-B, of April 25, 1935, which created Federal Petroleum Agency No. 1 as an administrative and investigative agency in connection with tenders presented to Federal Tender Board No. 1, and Executive Order No. 7129-A, of August 6, 1935, which required the submission to the Division of Investigations, Department of the Interior, of reports of loadings and discharges of certain cargoes of petroleum and petroleum products in interstate commerce, said Executive orders having been superseded by

Executive Orders Nos. 7757 and 7758. By Order No. 1263, of April 1, 1938, the Secretary of the Interior prescribed and approved forms of reports required under Executive Orders Nos. 7757 and 7758.

OPERATIONS IN THE EAST TEXAS AREA

Federal Tender Board No. 1, at Kilgore, Tex., was reestablished by Executive Order No. 7758, of December 1, 1937, under the Connally law as extended. It operates in a designated area, known as the East Texas field, and is required, upon application, to issue certificates of clearance, or tenders, permitting the shipment in interstate commerce of petroleum or petroleum products whenever it determines that the petroleum or petroleum products do not constitute contraband oil, as defined in the act.

During the fiscal year, 6,942 applications for tenders, of which 4,992 were for 254,614,303 barrels of crude oil and 1,950 for 27,716,209 barrels of petroleum products, were received and considered. All of the applications were approved except 76 for 2,533,367 barrels of crude oil and 19 for 149,935 barrels of products. Tenders were approved for 251,628,058 barrels of crude oil and 27,641,664 barrels of petroleum products. Eighteen approved applications for tenders were reduced by the Board in the aggregate quantity of 512,418 barrels. At the close of the fiscal year, 25 tender applications, involving 1,793,324 barrels of crude oil and 55,272 barrels of products, were pending. The aggregate quantity of petroleum approved for shipment in interstate commerce was substantially larger than that actually produced in the East Texas field, owing to the retendering monthly of legally produced oil held in storage and oil previously tendered but not shipped, the approval of tenders covering oil produced elsewhere but received in the East Texas area, and the issuance of tenders on oil interchanged between companies operating in the area.

During the fiscal year, the reported actual production of petroleum in the East Texas field was 158,640,553 barrels, or 434,645 barrels daily, while withdrawals of East Texas crude oil from storage totaled 654,136 barrels, making a total of 159,294,689 barrels. Of this amount, 150,555,255 barrels, or 94.5 percent, was shipped from the area through the 13 trunk pipe lines; 8,637,152 barrels, or 5.4 percent, was processed at refineries located in the field; and the balance of 102,282 barrels, or 0.1 percent, includes crude used in the field, inventory adjustments, and losses.

There were 25,261 producing oil wells in the East Texas field on June 30, 1938, of which 2,457 were completed during the fiscal year, as compared with 2,128 new well completions during the previous fiscal year. The average well density of the field was increased from one well to 5.7 acres on June 30, 1937, to one well per 5.2 acres on

June 30, 1938. The average reservoir pressure declined from 1,163.26 pounds per square inch on June 12, 1937, to 1,120.84 pounds per square inch on June 8, 1938, a decrease of 42.42 pounds. An average of approximately 3,740,000 barrels of crude oil was produced for each pound of decline in reservoir pressure.

Ten refineries were operating on Federal tenders in the East Texas field at the beginning of the fiscal year and eight at the close. These plants processed 9,685,205 barrels of crude oil, of which 8,637,152 barrels, or 89 percent, was obtained from the East Texas field, and 1,048,053 barrels, or 11 percent, was obtained from other fields. The receipt of crude oil from other sources than the East Texas field increased materially during the latter half of the fiscal year, reaching a peak in June 1938, when 30 percent of the crude oil processed in East Texas refineries was obtained from other fields in Texas, Louisiana, and Arkansas.

The following table summarizes the operations, during the fiscal year, of the East Texas refineries operating on Federal tenders and shipping in interstate commerce.

Summary of East Texas Refinery Operations, 1938 Fiscal Year

	Barrels	Percent
East Texas crude charged to stills.....	8,637,152	89.18
Southwest Texas crude charged to stills.....	123,257	1.27
Louisiana crude charged to stills.....	897,187	9.26
Arkansas crude charged to stills.....	27,609	.29
Total crude distilled.....	9,685,205	100.00
Products manufactured:		
Gasoline and naphthas.....	5,735,222	59.22
Kerosene.....	486,742	5.02
Gas oils and distillates.....	282,732	2.92
Fuel oil.....	2,016,501	20.82
Unfinished oils.....	722,446	7.46
Losses in refining.....	441,562	4.56
Total.....	9,685,205	100.00

Sixteen natural gasoline plants, connected to 23,018 wells on June 30, 1938, reported operations to Federal Tender Board No. 1 during the fiscal year. These plants processed 49,239,915 m. c. f. of lease and still gas and extracted therefrom 5,973,613 barrels of natural gasoline, 496,144 barrels of butane, and 24,653 barrels of propane, or a total of 6,494,410 barrels. This represents an average of 5.5 gallons of natural gasoline, butanes and propanes per m. c. f. of gas processed. The average gas-oil ratio of the 23,018 wells connected to these plants during June, 1938, was 346.75 cu. ft. per barrel of crude.

EXAMINATIONS OUTSIDE OF THE EAST TEXAS AREA

Regulation XIX, of Executive Order No. 7757, provides that the Petroleum Conservation Division or any board established under the Connally law, when authorized by the Secretary of the Interior, shall make necessary investigations, within or outside of any designated area, to accomplish the purposes of said act. Several investigations were authorized by the Secretary of the Interior, under said regulation, between its effective date, December 1, 1937, and the close of the fiscal year.

On March 9, 1938, the Secretary of the Interior authorized an investigation of certain injunction proceedings brought against the Arkansas Board of Conservation and the status, under the Connally law, of oil produced in the south Miller County field, Arkansas, during the period covered by the injunction. A similar inquiry was authorized June 17, 1938, as to certain petroleum produced in Kansas under injunction against the Kansas Corporation Commission.

On April 7, 1938, the Secretary of the Interior authorized an extended investigation of alleged excessive production of crude oil in a number of fields in Southern Louisiana. On April 21, 1938, he authorized an examination of the oil-proration procedure in the States of Arkansas, Kansas, Louisiana, New Mexico, Oklahoma, and Texas, for the purpose of determining the manner in which said procedure affects the administration of the Act of February 22, 1935, and contributes to the ultimate recovery and the conservation of oil and gas resources. All of said investigations were undertaken by Federal Tender Board No. 1.

DAILY REPORT ON EAST TEXAS TANK-CAR SHIPMENTS

Regulation XV, Executive Order No. 7757, of December 1, 1937, provides that each transporting agency, other than pipe lines, shall make available daily to Federal Tender Board No. 1 copies of all way-bills covering the movement during the preceding day of petroleum or petroleum products in or from the East Texas area. The information thus obtained as to tank car shipments of petroleum products from the area is tabulated in a special daily report, which includes the tank car designation, capacity and contents, shipper, consignee and destination. A copy of this report is mailed daily to designated officials of all States in which tank car shipments of petroleum products from the East Texas area customarily are received. Shipments as reported in the reports are checked by the State officials against the actual receipts and Federal Tender Board No. 1 notified as to diversion of shipments or other differences. The following table shows the trend

of gasoline production and shipments by tank car from the East Texas area during the 1938 fiscal year:

Gasoline Production and Shipments From East Texas Field by Tank Car

[In barrels]

	Shipments				Produced in East Texas refineries
	Intra-State	Coastwise	Interstate	Total	
1937:					
July.....	275,082	198,708	219,260	693,050	649,000
August.....	245,429	155,238	240,160	640,827	642,131
September.....	265,559	179,115	259,057	703,731	654,900
October.....	231,959	141,383	216,574	589,916	600,233
November.....	180,083	105,057	270,391	555,531	579,682
December.....	182,885	97,628	195,947	476,460	480,373
1938:					
January.....	132,738	55,542	175,685	363,965	395,417
February.....	176,775	105,409	98,338	380,522	330,158
March.....	143,536	68,647	141,239	353,422	342,768
April.....	106,509	39,156	128,682	274,347	386,289
May.....	143,791	72,125	157,749	373,665	341,323
June.....	120,833	50,815	148,733	320,381	332,948
Total.....	2,205,179	1,268,823	2,251,815	5,725,817	5,735,222

NOTE.—Coastwise shipments are those transported by tank car to the Gulf Coast for shipment by water to Atlantic Coast. Interstate shipments are those to Midwestern States. Refinery production does not include output of plants operating without Federal tenders and shipping gasoline by truck to points in Texas.

REPORTS ON PETROLEUM SHIPMENTS BY WATER

Regulation XVIII, Executive Order No. 7757, dated December 1, 1937, requires the submission of reports (on Forms OCR-1 and OCR-2) covering the loading at any port in Texas and Louisiana of petroleum or petroleum products for shipments by water in intermediate and interstate commerce and the unloading of said cargoes at any port in the United States. New forms were approved by the Secretary of the Interior for use in this connection, effective April 1, 1938. In addition to the information required previously as to the vessel and cargo (the OCR-1) form in use since April 1 requires the duly authorized agent of the shipper to cite the number and date of the State tender or the date and designation of the order of the State regulatory commission applicable to the cargo loaded and requires the execution of the report before a notary public.

Shipments reported to have been made under tenders issued by the Railroad Commission of Texas are totalled and a comparison thereof is made monthly with the tenders as issued by the commission to make certain that shipments thereunder were not in excess of the amounts authorized. Similarly, cargoes of petroleum loaded at ports in Louisiana are checked against the appropriate production orders of the Louisiana Department of Conservation. Cargoes originating in New Mexico and Oklahoma also are checked against the production orders of the New Mexico Oil Conservation Commission and the Oklahoma Corporation Commission. A copy of each report covering the loading of a cargo of petroleum products for shipment in interstate com-

merce is forwarded, promptly upon its receipt by the Petroleum Conservation Division, to a designated official of the State in which the reported destination of the shipment is located, in order to provide information as to the reported cargo in advance of its arrival. At the close of each month, the details of each shipment, including State tender or order number, are tabulated and a photostatic copy of the report is sent to all interested State and Federal agencies.

These reports, covering the loadings of cargoes of petroleum and petroleum products, provide a procedure for checking a substantial proportion of the petroleum shipped in commerce in Louisiana and Texas, to make certain that said shipments do not include petroleum or petroleum products produced in excess of the amounts permitted by State law or orders thereunder. The total of all loadings of petroleum and petroleum products at Texas ports, reported on Form OCR-1 during June 1938, was equal to 70 percent of the calculated total of all oils handled in Texas during that month, including current production, receipts from Louisiana, New Mexico, and Oklahoma, and withdrawals from or additions to storage; while loadings at Louisiana ports, similarly reported, were equal to 81 percent of all oils handled in southern Louisiana.

COST OF ADMINISTRATION

The administration of the act of February 22, 1935, is essentially a field activity. Of the 94 persons employed at the close of the fiscal year, 76 were in the field and 18 in Washington.

The following table shows the expenditures made of available funds:

Personal services:	<i>Appropriation</i>
Petroleum Conservation Division.....	\$45, 300
Federal Tender Board No. 1.....	174, 360
Total.....	219, 660
Miscellaneous:	
Materials and Supplies.....	12, 453
Communications.....	2, 252
Travel.....	8, 232
Transportation of things.....	511
Printing and binding.....	2, 823
Rent of buildings.....	6, 737
Equipment.....	7, 248
Total.....	40, 256
Total obligated.....	259, 916
Unobligated.....	25, 084
Total funds available.....	285, 000

DIVISION OF INFORMATION

Michael W. Straus, Director

A DIVISION OF INFORMATION within the Office of the Secretary was established by administrative order No. 1213, dated September 24, 1937.

The Division coordinates the various informational activities of the Department and disseminates useful information developed by the economic, research, and conservation programs of the Department.

The Division supervises preparation of publications, public announcements and releases to the press with the exception of purely scientific and technical papers; supervises radio programs sponsored or authorized by the Department, and supervises the production and distribution of official photographs.

The Division consists of the Director's office, a Radio Section, a Publications Section, and a Photographic Section.

DIVISION OF MOTION PICTURES

Randall M. White, *Acting Director*

A SIGNIFICANT development during the Division's fourth year of operation has been the greatly increased interest on the part of the general public in motion pictures dealing with governmental activities.

The distribution of film in all fields was more than doubled during the year. Approximately 500 Civilian Conservation Corps camps received regular weekly service to supplement their educational programs; thousands of schools used the same productions as integral parts of their curricula. The size of the library was not materially increased, but more efficient methods of handling kept 50 percent more reels in constant circulation than during the previous year. C. C. C. camp circuits were established to minimize time lost in transit. Requests for films by schools, churches, fraternal and other organizations were accommodated insofar as prints were available but the Division was obliged to deny service to 25,000 borrowers with potential exhibition to at least 3,000,000 people. An increase of at least 25 percent in prints of the Division's catalog would have been required to meet the demands during the fiscal year.

Motion-picture-making activities of the Division were confined to the production of sound subjects for governmental agencies, both inside and outside the Department of the Interior, on a repay basis. "Home Rule on the Range" exemplified the workings of the Taylor Grazing Act for Interior's Division of Grazing. "Know Your Coal" was produced for the Consumers Counsel of the National Bituminous Coal Commission. "Help by the Carload" was made for the Government Printing Office as part of its campaign to increase the sale and distribution of public documents. "The Land—To Have and to Hold," for the Farm Credit Administration, deals with the problem of agricultural credit in relation to the Federal Farm Loan Act, the Federal land banks, and the national farm loan associations.

OFFICE OF EXHIBITS

G. C. Dickens, *Supervisor*

GOVERNMENT participation through exhibits at national and international expositions, State fairs, and at scientific and educational conventions, has become an established policy. One important function of all Government departments and independent establishments should be to acquaint the general public with the many, varied services being carried on by them for the benefit of the people.

Experience has proven that one of the most satisfactory methods of informing the public is participation in expositions and the other meetings. In this work the use of motion pictures, animated dioramas, cycloramas and panoramas, models, stereopticon slides and colored transparencies, and murals, has proven to be highly successful and adaptable. In making presentations relating to our island and Territorial possessions and the American Indian, experience has proved that the display of native handicraft is important.

The Office of Exhibits has designed and constructed departmental exhibits which have been displayed at the Great Lakes and Texas expositions. In addition, one diorama has been designed and constructed for the Division of Territories and Island Possessions, and another large diorama, with day and night, animation, and sound effects, is in the course of construction. The Office of Exhibits is constructing the conservation exhibit which will be displayed in the Federal Building at the New York World's Fair in 1939 as well as six dioramas for the foods exhibit at the same exposition.

OFFICE OF THE ADVISER ON NEGRO AFFAIRS

Dewey R. Jones, *Associate Adviser*

NEGRO participation in the national park recreational demonstration program was one of the major interests of the Adviser on Negro Affairs during the year. Other activities of the Adviser included the publishing of reports on the survey of the training and employment of white collar and skilled Negro workers; C. C. C. personnel problems, labor problems on Bureau of Reclamation projects and personnel problems within the Department.

During the past fiscal year plans have been worked out between the National Park Service and the Office of the Adviser on Negro Affairs which called for six demonstration projects for Negro use in the Southern States, to be completed by the summer of 1939, as part of the national park recreational demonstration program. Plans have also been completed for Negro participation in other projects of this program in northern and western States. In the last fiscal year the Adviser made trips to Louisville, Ky., Nashville, Tenn., Birmingham, Ala., Memphis, Tenn., Atlanta, Ga., Durham, N. C., Richmond, Va., St. Louis, Mo., Grand Rapids, Mich., Indianapolis, Ind., Cincinnati, Ohio, and Chicago, Ill., and conferred with national park officials in Regions 1 and 2 in connection with this program.

SURVEY

As administrator of the survey on the training and employment of white collar and skilled Negro workers, the Adviser on Negro Affairs continued the second phase of this program during the past fiscal year. Statistical information on Negro urban workers, gathered in the first part of this survey, was published as volume 1 of the report by this office. At the same time volume 2 was at the Government Printing Office. Begun in 1936, the survey employed 1,800 people in 86 cities and was financed by an allocation of \$476,000 from the Works Progress Administration. Workers in this phase of the survey turned in 350,000 Hollerith punch cards which furnished the data on which the report is based. At the end of the past fiscal year 25 persons were at work in this office taking off data from these cards which will be used in the third volume of the series. Volume 1 of the report has already proven of interest to social workers, those interested in labor and racial problems, and to colleges.

HOUSING

The Wagner-Steagall Housing Act created the United States Housing Authority and transferred from the Public Works Administration its Division of Housing. One of the major interests of the Adviser on Negro Affairs had been the Negro participation in the P. W. A. housing program both as workers and tenants. It is estimated that 40 percent of the money spent by P. W. A. for low-cost housing was spent on projects to be occupied by Negroes. Of the projects planned for Negro occupancy, at least 20 will have Negro managers or assistant managers. With the consent and cooperation of the Director of Emergency Personnel most of the applicants for these places were personally interviewed either by the Adviser on Negro Affairs or the Associate Adviser.

Contract requirements suggested by the Adviser on Negro Affairs and carried out by the Legal Division of the Public Works Administration specified definite percentages for Negro skilled and unskilled labor for the construction work on low-cost housing. The final labor report covering all projects built by the Housing Division of P. W. A. shows that Negro mechanics received 6 percent of the money spent for skilled labor and 40 percent of the money spent for unskilled labor. Dr. Robert C. Weaver, Adviser on Negro Affairs since 1934, became Special Assistant to the Administrator of the United States Housing Authority in January 1938.

BOARD ON GEOGRAPHICAL NAMES

George C. Martin, *Executive Secretary*

THE UNITED STATES BOARD ON GEOGRAPHICAL NAMES provides for uniformity in the use of geographic names on maps and in publications issued by the Federal Government.

The Board also serves as an informally recognized standard authority in the nongovernmental use of geographic names. In this capacity it gives decisions on geographic names at the request of the local officials of the States, or at the request of institutions, publishers, or other individuals. Such decisions are binding equally with those rendered at governmental request, so far as the governmental use of the name is concerned, but they are not binding upon other users. As the general, nongovernmental acceptance of the decisions of the Board is based upon the prestige of the Board and upon the merits of its decisions, rather than upon any legal basis, special efforts are made to see that the decisions merit such acceptance.

There has been a belief that the decisions of the Board are changes in names. The decisions of the Board, for the most part, are findings of fact as to which of two or more conflicting names is the actual name that has been conferred by local or other competent authority or sanctioned by local usage. The Board very rarely changes a name, and then only for some very compelling reason. As the main purpose of the Board is to insure uniform usage and to prevent confusion, every effort is made to avoid changes in names and to recognize and help to establish appropriate existing names.

The Board consists of an advisory committee, on which various Government departments and geographic societies are represented, which acts chiefly through its executive committee; and of an administrative and investigative unit, the Division of Geographic Names, the office of the Secretary of the Interior. The personnel of the advisory and executive committees, on June 30, 1938, was as follows:

ADVISORY COMMITTEE

Lt. Commander K. T. Adams, Assistant Chief, Division of Charts, Coast and Geodetic Survey, Department of Commerce.

Mr. Clarence Batschelet, Geographer, Bureau of the Census, Department of Commerce.

Mr. Albert H. Bumstead, Chief Cartographer, National Geographic Society.

ST. ELIZABETHS HOSPITAL

Winfred Overholser, M. D., *Superintendent*

I HAVE the honor to submit herewith my first annual report as Superintendent of St. Elizabeths Hospital.

On March 3, 1855, the Congress, in establishing this institution, declared its objects to be "the most humane care and enlightened curative treatment" of the patients who should enter its walls. Under the progressive leadership of my four distinguished predecessors, Dr. Charles H. Nichols, Dr. W. W. Godding, Dr. A. B. Richardson, and Dr. William Alanson White, the institution has achieved an enviable reputation as one of the outstanding mental hospitals of the world. Having been honored by beings elected to succeed these great men, it will be my consistent aim and the object of my most earnest efforts to maintain the high traditions and standards of St. Elizabeths Hospital.

Psychiatry has progressed far since 1855, and is still in a state of flux. In the past this hospital has made its contributions to psychiatric knowledge, and has always shown a readiness to accept the discoveries and findings of others so far as they promised to add to the comfort and welfare of the patients. The hospital was one of the pioneers in this country, for example, in the use of hydrotherapy, and was the first in the United States to employ the malarial treatment of general paresis developed so brilliantly by Wagner-Jauregg. As time goes on, new methods of treatment will be developed, perhaps here, perhaps elsewhere. As they are developed and appear to offer benefit to the patients, they will be adopted. Whatever the scientific developments in the field of psychiatry, however, one old and sound principle will always be adhered to; that of kindness, considerateness and courtesy in dealing with patients, their relatives, the employees and the public, with the welfare of the patient ever paramount.

The functions of a public mental hospital do not end with "the most humane care and enlightened curative treatment" of its patients. Such an institution owes an obligation to the scientific world in spreading knowledge and in carrying on research activities. The tradition of teaching at St. Elizabeths Hospital is a long one. The hospital is recognized by the American Medical Association and the American College of Surgeons for the training of internes (rotating internship), probably being the only mental hospital in the country

so recognized. In addition, it is accredited for the training of residents in psychiatry. This institution is proud of the large number of its medical alumni who have achieved success in the psychiatric world. The vast amount of clinical material available for teaching purposes is likewise used in the teaching of the medical students of George Washington, Georgetown, and Howard Universities. Postgraduate instruction is given to officers in training in the Naval Medical School, and in addition officers of the Army and Navy Medical Corps are assigned to the hospital for instruction. Other teaching activities involve college classes in psychology, and students in social work and dietetics. It is quite likely that in the future these activities will be extended to include students of theology and of occupational therapy.

MOVEMENT OF PATIENT POPULATION

On June 30, 1938, 5,968 patients remained in the hospital as compared with 5,667 on June 30, 1937, an increase of 301.

The total number of patients under treatment during the year was 6,696, as compared with 6,489 the preceding year, an increase of 207.

The total number of admissions during the year was 1,029, as compared with 1,099 the preceding year, a decrease of 70. This decrease was due primarily to the passage of the Act on June 8, 1938 entitled "Commission on Mental Health of the District of Columbia," providing for the admission of District patients. From the date of approval of this act until appropriation was made permitting the new Commission to function, there were no admissions to the hospital from the District of Columbia, that is, from June 8, 1938 to June 30, 1938, inclusive.

The total number of discharges for the year was 461, as compared with 490 in the preceding year, a decrease of 29.

The total number of deaths for the year was 267, as compared with 332 for the preceding year, a decrease of 65. It will be noted that there is a decrease in the number of deaths, notwithstanding an increase in population.

The total number of discharges and deaths, combined, was 728, compared with 822 for the preceding year, a decrease of 94.

There were 64 burials in the hospital cemetery, as compared with 50 the preceding year, an increase of 14. All honorably discharged service men are entitled to burial in the Arlington National Cemetery. Several former service men who had been dishonorably discharged are included in those buried in the hospital cemetery, in that part known as the military section. The other 203 bodies were buried by private undertakers, in military and other cemeteries in Washington and elsewhere throughout the United States.

The daily average patient population was 5,835.7, as compared with 5,537.6 the preceding year, an increase of 298.1.

Movement of Patient Population, Fiscal Year 1938

	Male			Female			Total
	White	Colored	Total	White	Colored	Total	
Remaining on rolls June 30, 1937.....	2,854	890	3,744	1,207	716	1,923	5,667
Admitted during year ended June 30, 1938.....	496	179	675	240	114	354	1,029
Total number under care and treatment during year ended June 30, 1938.....	3,350	1,069	4,419	1,447	830	2,277	6,696
Discharged as—							
Not insane.....	5	1	6	0	1	1	7
Recovered.....	80	15	95	21	15	36	131
Improved.....	104	28	132	30	7	37	169
Unimproved.....	96	18	114	27	13	40	154
Total discharged.....	285	62	347	78	36	114	461
Died.....	106	67	173	54	40	94	267
Total of patients discharged and died.....	391	129	520	132	76	208	728
Number of patients remaining on rolls June 30, 1938.....	2,959	940	3,899	1,315	754	2,069	5,968

MEDICAL DEPARTMENT

Medical services.—The women's service has made several changes, transferring the disturbed patients from C building to P building, and changing the patients from B to C building. L building, which was formerly an open building, is now a closed ward in order to take better care of this class of patients. J and K buildings, formerly used for white patients, are now used to house colored patients. This reduced the number of patients in the Oaks buildings, which were very much overcrowded.

All the feeble white patients have been transferred to C building. Here it has been possible to classify this group of patients more satisfactorily, as there are four wards in the building whereas this group, which was formerly housed in I building and which had no separate wards, was permitted no suitable classification. The patients formerly in K building have been transferred to I building.

Ward No. 3 in the women's receiving service was in use as a special treatment ward for insulin and metrazol therapy from September 1, 1937, until June 1, 1938, when the ward was closed for the summer months. About 100 patients were treated during the period. Prior to the starting of the insulin therapy, Rorschach tests were made on patients and will be checked again following completion of therapy. Due to the excessive heat during the months of June, July, and August, it was not considered advisable to continue the insulin treatment. It is expected that the ward will be reopened soon after September 1, 1938, for continuation of the special treatment.

Equipment has been purchased for a beauty parlor on the colored service. The basement of Q building is to be remodeled to house this equipment.

Tuberculosis cottages No. 4 and No. 5, formerly used for tuberculous patients, are now vacant as these patients were transferred to Glenside Building, formerly known as Isolation Building. The name of the tuberculosis cottages will be changed to female cottages No. 1 and No. 2 and be used for housing colored patients, providing 44 additional beds for this purpose.

Studies are being carried on at present concerning the effects of benzedrine sulphate in depressions, and of amniotin and theelin in the depressions of later life. Investigations of the significance of hyperostosis frontalis interna are under way.

A project on the study of the relationship between hearing defects and paranoid tendencies has been begun.

A study of the effect of a new drug, dilantin, upon epileptic convulsions has been started.

The colored male patients, formerly cared for in tuberculosis cottage No. 1, have been transferred to ward No. 3 of the building for male tuberculous patients. Following this transfer cottage No. 1 was carefully cleaned and disinfected and turned over to white non-tuberculous patients.

The names of the tuberculosis cottages No. 1, No. 2, and No. 3 were changed to male cottages 1, 2, and 3.

The male Indian patients are cared for in ward C of Continuous Treatment Building No. 2.

The quadrangle in the rear of Continuous Treatment Buildings No. 1 and No. 2 is of great value in giving the patients in these two buildings a sufficient amount of fresh air and exercise. They are allowed to play ball and indulge in other suitable forms of recreation, and seem to enjoy these privileges.

Medical and surgical service.—There is noted a marked increase in the number of tuberculous patients admitted to the service for the purpose of receiving pneumothorax therapy. There are listed 17 such patients and each patient has received pneumothorax a varying number of times.

The malarial treatment of paretics has proceeded as usual, with periodic inoculations. The type of malaria used during the past year has been exclusively the quartan type. Toward the end of the year, however, arrangements were made for reintroducing into the service the use of tertian malaria to be used with those patients who did not successfully take quartan malaria.

Greater efficiency and ease of treatment and better results in the cases of fractures of the hip have been noted since the surgical service acquired the necessary apparatus and equipment for the use of the Smith-Peterson nail.

The number of operations reported by the Surgical Service for the fiscal year was 227.

The antiluetic clinic reported 9,819 patient visits during the year. Each of these visits was for the purpose either of withdrawing blood or spinal fluid for serological examination, or giving intravenous or intramuscular therapy.

A group of paretic patients who have been resistant to malarial therapy and the usual antiluetic drugs, has been placed on a new pentavalent arsenical known as "Aldarson." "

During the year patients have been examined and treated in the various special clinics as follows:

Ophthalmological.....	670
Otolaryngological.....	407
Dermatological.....	1, 399
Gynecological.....	642
Urological.....	598

Nine hundred and sixty-five patients have come to the physiotherapy clinic, and these and patients in the ward have received 10,728 treatments.

During the year 4,283 radiographs were made on 2,518 patients, and 588 X-ray treatments were administered to 104 patients.

Three thousand five hundred and three patients have made 6,004 visits to the dental clinic.

Two thousand three hundred and six patients have made 4,009 visits to the minor surgical clinic.

Laboratory.—Out of 267 deaths, 174 autopsies were held, a percentage of 66 $\frac{2}{3}$ percent.

One hundred and forty-one brains were dissected during the year, 139 surgical specimens were studied, and 183 gross specimens were photographed.

In the photographic department there were 1,308 pictures taken, 2,059 other prints, and 1,000 feet of 16 mm. motion pictures

In the clinical pathological department there were 4,834 routine examinations of urine, 1,479 hemoglobin estimations, and 251 examinations of sputum.

Great numbers of blood chemistry and glucose tolerance tests were carried out preparatory to, during, and after many individual courses of treatment.

A quotation from the report of the committee appointed by the Secretary of the Interior, with the approval of the President, in 1911, is timely:

It is believed that the medical staff of the hospital should do its share by scientific research in adding to the general fund of information regarding disorders of mind, making every effort within its power to throw light upon the complicated problems with which it has to deal. Further than this, aside wholly from what may or may not be accomplished in the way of adding to the fund of information regarding mental disorder by research work, the presence of scientific research going on in a hospital is essential at this day and age to keep the medical staff

acutely, actively, and aggressively interested in the problems with which they come into daily contact, and it alone is capable of so improving the esprit de corps as to increase materially the efficiency of the hospital in dealing with its patient problems. Scientific work going on in an institution for the care of the insane is some sort of a barometric index of the kind of care that they are receiving. Places where scientific research is not being conducted are apt to be places where problems of care and treatment are not being aggressively attacked and advanced, whereas the contrary is true in general of those institutions where scientific work is being done. The spirit that makes for progress is the spirit that is fostered by scientific research.

The scientific work of the laboratory of this hospital has been noteworthy. The vacancy created by the resignation of Dr. Nolan D. C. Lewis in 1935 to become director of the New York State Psychiatric Institute has been filled by the appointment of Dr. Solomon Katzenbogen, for 10 years on the staff of the Henry Phipps Psychiatric Clinic of the Johns Hopkins Hospital, and associate professor of psychiatry in Johns Hopkins Medical School. Dr. Katzenbogen is widely known as a scientist and as a valued contributor to the psychiatric literature. He will act as Director of Laboratories and Research.

It is my hope that the publication of the St. Elizabeths Hospital Bulletin may be resumed as a means of making available the results of the investigations, treatment, and research of the staff.

ADMINISTRATIVE DEPARTMENT—OFFICE OF THE ASSISTANT TO THE SUPERINTENDENT

Supplies.—The supplies produced on the hospital reservation, including farm and garden products such as tomatoes, beans, parsley, spinach, etc., included the following: 289,241 gallons of milk, 127,517 pounds of fresh pork, 6,867 dozen eggs, 13,801 pounds of chicken, 13,601 bunches and 68 bushels of beets, 1,501 bushels of cabbage, 41,771 bunches of carrots, 23,047 ears of green corn, 5,000 pounds of grapes, 1,948 bushels of kale, 42,050 heads of lettuce, 72,315 bunches of green onions, 203 bushels of oyster plant, 7,554 bunches of parsley, 873 bushels of sweet potatoes, 29,903 bunches of radishes, 486 bushels of spinach, 327 bushels of squash and 340 single squash, 827 bushels of Swiss chard, 1,725 bushels of tomatoes, 2,200 bunches and 1,774 bushels of turnips.

In addition to the items mentioned, there were manufactured at the hospital 25,216 gallons of ice cream. The farm produced forage as follows: 37½ tons of alfalfa hay, 23 tons of soybean and sudan-grass hay, 45 tons of timothy hay, 20 tons of timothy and grass mixed, 6 tons of wheat hay, 878.6 tons of corn ensilage, and 2,560 bushels of ear corn.

The shoe shop produced 11,235 pairs of various kinds of shoes and slippers, and in addition 2,461 pairs of shoes and slippers were repaired,

237 dozen men's belts, 262 dozen pairs of suspenders, 2,187 brushes, and 234 floor brooms were made in the same department. The broom shop produced 5,579 common brooms and 145 whisk brooms. There were made in the mattress shop 2,872 mattresses and 2,636 pillows. In the bakery there were baked 903,198 loaves of bread, 65,340 pounds of pastry, and 3,324,168 rolls. The laundry washed, dried, and ironed 14,387,256 pieces. The power plant manufactured 545,858,000 pounds of steam; the electrical department generated 3,822,481 kilowatts of electricity; there were pumped 425,397,000 gallons of water, and the main refrigeration plant produced 7,493 tons of ice and refrigeration. All the steam, electricity, ice, and refrigeration used on the reservation were manufactured by the hospital.

In addition, large quantities of clothing for men and women were made in the sewing rooms, tailor shops and occupational therapy departments. The patients on the wards, under the direction of the occupational therapists, made all the dresses furnished the patients, hemmed all the sheets and blankets, assisted in making stand covers, table covers, tablecloths, towels, wove stand covers, rugs, towels, and similar items, and manufactured many hundreds of small toys and recreation items, such as checkerboards, chessboards, cribbage boards, dolls, etc.

Dairy and cow barn.—The Holstein-Friesian herd was again tested for tuberculosis in March and found to be practically free from this disease. While there were two suspects, which were afterwards destroyed, there was no pathological trace of the active disease. The herd, consisting of 252 cows, 87 heifers, 86 calves, and 8 bulls, is one of the largest accredited herds in the country. It is bled twice yearly to determine its freedom from Bang's disease. All animals were negative to the agglutination test.

The output of milk has increased but has not kept pace with the increase of patients. By elimination of the unprofitable cows and careful breeding and feeding the production has been increased until during the past year it averaged more than 12,000 pounds of milk per cow. It cannot be hoped that this output can be materially increased without additional animals. On the other hand, we are confronted with the proposition that there is no further room in the present barns for additional animals. The farm land has been gradually lessened due to taking portions of the land for the construction of buildings, until there is practically none available for new barns and certainly none to be used for raising of feed and for grazing.

The shortage of milk and the necessity for the increase of farm animals, which will require more land, has been confronting the hospital for several years. This is the basis of the estimate for an appropriation for additional land included in the needs of the hospital.

With the increased population the hospital would require a daily production of about 1,000 gallons of milk, compared to the maximum under the present conditions of 875 gallons and a minimum of 600 gallons per day. It would probably require a herd of between 325 and 350 cows to produce the estimated quantity of milk. Of this number, from 60 to 70 would be dry, and in the excessive heat of July, August, and September the production might drop to below 900 gallons of milk daily.

Hogs.—The herd of hogs is in excellent condition and numbers 1,065, which produced 127,517 pounds of fresh pork during the year.

Again we are confronted with the proposition of crowded conditions. The pens are inadequate for the number of pigs raised, resulting in a large loss of little pigs due to smothering in crowding each other in very cold weather. Proper conditions can only be maintained by the acquisition of additional land.

Garden truck.—Conditions for growing vegetables during the past year were better than they have been for several years. For the past several years all of the fall-planted cabbage has been winter-killed, and other crops have suffered from droughts, insect pests, and similar causes. The past year the crops which have suffered most were squash, pumpkins, cucumbers, and other cucurbits, because of the prevalence of the cucumber beetle and the green aphid which worked havoc with the cabbage, kale, collards, and related crops. By intensified gardening with periodic planting we were able to increase materially the output of most of the plants and to keep green vegetables on the tables for the patients during most of the year.

Lawns and grounds.—The grading and resowing with grass seed of the lawns near Oaks D and Toner kitchen have materially improved this part of the grounds. The baseball field was regraded and filled in where low, planted with grass seed, and a pipe railing 300 feet in length placed along the roadside. The large pond south of Center Building has been drained, cleaned out, and greatly improved by repairs and larger flow of water; eight pond lilies in tubs on piers in a circle have been put in, and an island planted with a weeping willow tree and ornamental grasses.

A severe hailstorm visited the institution on April 29, breaking more than 6,000 panes of glass in the greenhouses and destroying many plants.

The hospital used 15,000 plants in flower beds and vases during the year.

Personnel.—The total number of employees on the hospital rolls June 30, 1938, was 1,726. There were 419 appointments during the year, and 390 separations.

During the year 17 of the old employees were retired from the service on account of age and disability.

Administrative promotions (salary rating increases) were granted to 722 employees. Promotions in grade and position were granted to 83 employees.

Among those retired, with terms of service, were:

		<i>Years</i>
Marshall Thomas.....	Junior laborer.....	10
Hallie M. Felker.....	Attendant.....	12
Orion J. Lawrence.....	do.....	13
Leland M. Edelen.....	do.....	13
Tom Taylor.....	Auto mechanic's helper.....	14
Saunders Harrell.....	In charge of garden truck farm.....	15
Elisabeth O. Robinson.....	Occupational therapy aide.....	16
Charles Wilson.....	Farm hand.....	18
William E. Moore.....	Junior laborer.....	18
Sadie E. Dorsey.....	Assistant cook.....	22
Ida B. Slaughter.....	Attendant.....	22
Robert E. Freeland.....	Charge psychiatric nurse.....	31
Frank Swider.....	General mason.....	31
Walber L. Sanders.....	Watch engineer.....	31
Martha A. Langley.....	Forewoman, sewing room.....	32
Lorena D. Cropp.....	Telephone operator.....	35
John F. Jenkins.....	Assistant supervisor.....	41

Rev. H. Waldo Manley, one of the hospital chaplains representing the Episcopal Church, resigned, and Rev. Roy E. LeMoine, of the same church, was appointed chaplain in his place.

During the year one colored graduate nurse and five colored attendants have been detailed to the colored women's service, and three colored male attendants to the colored men's service.

Purchases.—Supplies were ordered in the amount of \$1,900,000. Of this amount, \$888,864 were open market purchases, covered by 275 formal contracts. Included in these contracts was one for Continuous Treatment Building No. 3, \$264,000; Continuous Treatment Building No. 4, \$292,850; and vehicular underpass, \$42,059.

Financial office.—During the year disbursements approved through the financial office amounted to \$3,767,623.48 on a total of 4,353 vouchers. Collections received and deposited totaled \$2,854,970.99.

Chief clerk's office.—During the year 1938 in the stenographic office 18,715 letters were written, 4,077 handwritten notes typed, 16,691 dictaphone cylinders transcribed, and 4,750 notes from the laboratory and 964 histories pertaining to patients, totaling 10,960 pages, were written.

Post office.—Congress enacted legislation that permitted the hospital to reopen the post office, which was closed July 1, 1937, under the name of station L. This office is a great convenience to the patients, to the administration of the hospital, and to the employees.

Fire department.—Regular inspections were made of the whole hospital by the fire marshal for the purpose of protecting it from fire. The 825 soda extinguishers were refilled and tops locked, and also

179 pyrene extinguishers were refilled. The fire siren is tested monthly, and also the fire-alarm system. The fire pumps at the power-house are tested weekly, and the triple combination pumper is tested daily and put in service once a week. Inspections are made weekly with officers and privates of the District of Columbia Fire Department, and occasionally with inspectors from the fire marshal's office. Fire drills are held weekly in various wards of the institution.

During the year there have been 17 alarms, the property damage amounting to \$24. Approximate loss from fires from June 19, 1917, to June 30, 1938, is \$5,858.55, an average of \$278.98 per year.

Continuous Treatment Building No. 3.—Work was started on the construction of Continuous Treatment Building No. 3 on August 25, 1937, and the operation checked approximately 92 percent completed on June 30, 1938. This building will probably be ready for occupancy by October 1, 1938. Its completion will provide 186 additional beds.

Continuous-Treatment Building No. 4.—Plans and specifications were prepared and a contract awarded for the construction of Continuous-Treatment Building No. 4 as of June 30, 1938. The lowest bid was \$292,000, while the appropriation was \$290,000. It was necessary to secure a deficiency appropriation from Congress before the contract could be executed. Arrangements are already made to have the ground broken very shortly after July 1 in order that this building may be completed during the fiscal year 1938.

Continuous-Treatment Buildings Nos. 5 and 6.—Congress appropriated \$580,000 for two additional continuous treatment buildings, which will be numbered 5 and 6. Tentative plans for these buildings have been drawn and it is hoped that the architectural employees can be engaged in the near future to pursue this work.

Construction department.—Plans were drawn and a contract executed for a two-way vehicular underpass under Nichols Avenue. This work is completed and is being used for traffic. The old underpass was built in 1903, before the popular use of the automobile was in vogue. It was narrow and low and dangerous for foot passengers to pass while an automobile was going through at the same time. For a long time we have been apprehensive of possible accident and are greatly relieved that the new underpass has been completed. It provides a maximum of safety, and is high enough to permit the passages of loaded trucks and fire equipment. The old underpass will be used exclusively for pedestrians.

The hospital constructed a concrete and brick pipe tunnel under Dawes and Garfield basements.

Concrete roads, curbs and sidewalks were constructed between the fire engine house and Hitchcock Hall. The road and curb were

rebuilt around the triangle in front of Hitchcock Hall and from there to C building.

The underground passageway extending from B to C building, through the administration building, has been extended to M building, and a dumb-waiter has been installed in the latter building. The food service in M building has been greatly improved by this addition.

Center Building, one of the oldest structures on the reservation, is being renovated. The iron steps and platform at the south entrance to this building have been rebuilt with reinforced concrete, and new rails put in place. The old wooden staircase extending from the basement to the fourth floor has been torn down and a fireproof steel and terazzo stairway, with metal door frames, kalamein doors and concrete slab floors, erected in its place.

The restoration of the porte-cochere at the front entrance to Center Building is under way and this work is approximately 75 percent completed. The plans of the original, which stood for over 40 years, have been largely followed. The construction will add greatly to the appearance of this impressive old building.

One of the reception rooms in the E Nurses Home was renovated and made into an apartment for one of the assistant chiefs of the Training School who will reside in this building.

Among the changes on the reservation during the past year was the razing of the water tank that stood on the administration campus in front of L building. A new tank to replace it was recently erected in the rear of the women's receiving building.

The carpenter shop and the cabinet shop did all the necessary maintenance and repair work for all the buildings in the hospital, such as repair of broken furniture, beds, doors, windows, floors, guards, locks, fly screens, and kitchen, laundry, farm, and group equipment. Many new articles were made for use, such as tables, chairs, bulletin boards, cabinets, stools, and so on.

The tin shop maintained in proper repair the roofs of all the buildings, repaired numerous utensils, kept downspouts in full repair, and did other work incidental to this department.

Guard force.—The guard force has been zealous in its work, being ready to assist in keeping order and preventing losses whenever called upon.

Laundry.—The work of the laundry has increased to such a degree that it is difficult to see how any more pieces could be washed and ironed without either a larger building and more equipment, or putting the employees on two work-shifts. In the recommendations it is noted that in connection with a new building and warehouse, facilities should be made for a larger laundry. The laundry force deserves especial commendation for their efficient work in the face of serious crowding and overloading.

Culinary department.—The dietetic force, like other departments, has been under pressure due to the increased number of patients. In addition to this, the number of special diets has increased disproportionately, reflecting the individualized medical attention given to special nutritional problems among the patients.

The work of extending the cafeteria method of feeding patients continues to receive consideration.

All garbage is being weighed for the purpose of making comparison of the waste. This seems to have resulted in a decrease in the amount of certain classes of food needed and in a marked reduction in the amount of garbage.

In addition to looking after kitchens and the service of food, the dietitians give a regular course including lectures, laboratory work, and kitchen diet work to the student nurses.

During the year the dairy department pasteurized 289,241 gallons of milk, manufactured 25,216 gallons of ice cream, and made 20 gallons of buttermilk daily.

During the year Mr. Elwood Street, Director of Public Welfare of the District of Columbia, was active in organizing an informal association of dietitians and stewards of the various institutions of the District. Several meetings were held in various institutions, and on April 27 Mr. Street, accompanied by a group of 35 members of this group, came to the hospital, visited the kitchens, and had lunch at the employees' cafeteria.

Miss Kirkpatrick, head of the Home Economics Department at the George Washington University, brought a class of students to visit the kitchens and see the service of food.

Miss Barnes, instructor in food and nutrition at the University of Maryland, brought a class in institutional management to the hospital to see the kitchens and the service of food.

Steam connections.—The various gate houses and five of the seven staff cottages have been connected to receive steam from the main power plant, doing away with separate heating devices for each of these buildings.

Glenside Building.—The old isolation building, which had been vacant for some time, having been set aside for isolated patients who may be affected by contagious disease, has been thoroughly renovated and used to house the women tuberculous patients. This change represents a substantial improvement in the facilities for the care of this group of patients.

Radios.—Additional radio connections have been made in the various buildings, extending the use to those patients who could appreciate them.

Automatic telephone.—The hospital automatic telephone system traffic amounted to 1,565,169 calls, the daily average being 4,288 and the hourly average 178.

NEW LEGISLATION

One of the most significant events of the year was the enactment of Public, No. 582, Seventy-fifth Congress, approved by the President on June 8, 1938, reforming the commitment procedures. Until this year, the District of Columbia has had the unenviable distinction of possessing probably the most antiquated and barbaric laws relating to the commitment of mental patients to be found in this country. A situation in which in order to gain admittance to St. Elizabeths Hospital a resident of the District had to be summoned, haled into the criminal court room before a jury, there formally accused of being a lunatic, and forced to listen to the testimony of physicians, relatives, and friends as to his abnormal conduct and intimate details of his life and his family finances, for many years evoked the serious criticism of psychiatrists the country over. After several years of effort, the Medical Society of the District of Columbia this year secured the passage of an act whereby a fairly informal hearing by a commission of two psychiatrists and an attorney is substituted for a court proceeding, a jury trial being provided only on demand. There are practical defects in the law which will presumably be corrected later, but a major step forward has been made, a step which makes it no longer necessary for any humane and sympathetic resident of the District to hang his head in shame when commitment procedures are mentioned. It is my earnest hope that eventually provision may be made for the voluntary admission to the hospital of those patients who recognize the need of hospital care but who have not yet reached such a degree of illness as to constitute committability.

GROWTH OF THE HOSPITAL

In the report of the special committee of 1911, mention is made of the policy to be adopted relative to the growth of the institution and particularly the need of additional land. This problem not only remains with us, but has steadily increased in importance until now it becomes essential that additional land be secured and a recommendation for money for this purpose is made.

In the report of 1911 the committee states:

As an illustration of the importance for outlining a definite policy with reference to the future of the institution, it may be noted that from year to year various bills are introduced into Congress which contemplate taking a little bit of the hospital property here or a little bit there for public use, or running a road through the hospital grounds at this or that point.

Not only have little bits of ground been taken on several occasions, as cited in the report, but at the present time the hospital is con-

fronted with an even more serious situation, as the approaching completion of the so-called Fort Drive, previously authorized, will take a considerable section of the hospital ground. The proposed upper and lower roads from Washington to Fort Washington would have the effect of taking more land. Indeed, plans already projected for this road-building would necessitate the demolition of some of the semipermanent buildings, now occupied by patients, and the moving of staff residence No. 7.

The War Department has requested permission to establish radio towers on one portion of the farm for official use, stating that this was the most advantageous field adjacent to Bolling Field that is available.

The residents of Congress Heights have asked that about 12 acres of land on the Congress Heights farm be transferred to the District, or to the National Park Service of the Department of the Interior, for playground purposes for the children of the neighborhood.

These requests are in addition to the great amount of farm land that has been used in erecting new buildings. Practically all the new construction in the last 20 years was on sites formerly devoted to farming and truck gardening. It can readily be seen that the hospital must oppose any use of its property for other purposes until additional land is secured.

Farm colony.—In the report of the special committee of 1911 it was recommended:

The acquirement of additional land in the way of both farm lands and for buildings for patients, for the construction of a farm colony where the chronic, custodial, and physically well patients could be sent to do the work, is most desirable.

If the farm colony idea was desirable when this report was made, it is much more so at the present time when the population has practically doubled and the available land for farm purposes has been reduced one-third. Therefore, the securing of additional land for farm-colony purposes seems to be urgent.

RECREATIONAL, VOCATIONAL, AND OCCUPATIONAL WORK

Occupational therapy.—The number of patients enrolled in occupational therapy totaled 1,030. The patients working throughout the wards made 13,712 articles, besides the industrial work including 10,087 dresses, 7,666 pillow cases, 28,570 sheets, 1,080 slips, and 22,183 tea towels.

The printing shop, located in the occupational therapy room in the men's receiving building, turned out 221 jobs, totaling 130,684 copies.

Red Cross.—There has been a general increase in the work of the American Red Cross during the year.

During the year they wrote and sent out 5,893 letters and received 4,575 communications. The correspondence offers an excellent opportunity for mental hygiene interpretation and the fact that the patients about whom they are writing come from all over the country and from our island possessions, is indicative of the broad reach and of the many contacts they have made with social agencies and with individuals.

The Red Cross has continued its usual recreation program at the hospital. During the past year they had 88 moving-picture shows, 16 band concerts, 226 parties and entertainments, 363 ward programs, and furnished 4,430 tickets to theaters and ball games which have been donated for the patients.

During the past year the Red Cross authorities transferred all title to the building located at the hospital to the United States Government, and the hospital received a deed in fee which has been recorded in the Office of the Recorder of Deeds, District of Columbia.

The assistance of the Red Cross is invaluable and the hospital's deep appreciation of its services is hereby extended. No finer cooperation could be asked from a private organization than has been freely and enthusiastically given.

Social Service.—The social service report from July 1, 1937, to June 30, 1938, shows the following:

Number of out-patients on rolls July 1, 1937.....	122
Number of out-patients on rolls June 30, 1938.....	140
Average number on rolls per month.....	136
Number of surveys for visit.....	209
Average number of patients worked on each month.....	109

Libraries.—One hundred and thirty-five additional volumes have been added to the medical library, making the total number of books in the library at the present time 15,160. Fifty-nine current medical magazines were received, 20 of them of foreign publication. Some of these are sent to the various departments and the rest kept on file in the medical library. Three hundred reprints were indexed and bound in the patients' library. In addition to the books in the library, we are in receipt, through loan, of books in the Surgeon General's Library and the Library of Congress. The privilege of borrowing books has been greatly extended in keeping with the expanding activities of the hospital, and the physicians of the hospital staff are using the library more extensively in research work. The nurses also made constant use of the library in connection with their instruction course. Students in fields allied to psychiatry and from social agencies in the city and elsewhere availed themselves of the special facilities of the medical library.

One hundred and fifty books were added to the patients' library, making the total collection 16,530. Thirty-three popular magazines and five newspapers, daily and Sunday, were regularly received. Many

periodicals were given by persons interested in the hospital. Newspapers and magazines not suitable for binding are distributed to the wards. Approximately 300 books are drawn daily, two-thirds of them fiction, and there are about 3,600 books in constant circulation.

Training school.—Arrangements are being made to revive and reopen the training school for nurses. The United States Civil Service advertised an examination and requested applicants to file papers. It is hoped that these papers will be rated and certification made to the hospital in the near future. From the list furnished it is desired to select 50 among those who made the highest average for the purpose of starting the school. The courses have been rewritten and the curriculum, not only for the school itself but for the post-graduate course, has been changed.

The senior students in the present school of nursing will complete their course and expect to hold graduation services in October 1938.

Arrangements are under way for making affiliation at Bellevue Hospital or Philadelphia General Hospital for women, and similar arrangements will be made for men.

The importance of a nurses' training school in a large mental hospital can hardly be overestimated. A large and well equipped hospital such as St. Elizabeths is as competent to give a 3-year course (with the aid of certain affiliations) as any general hospital; in addition, the graduates of such a course are imbued from the outset with a psychiatric attitude toward the patient, an appreciation of the patient as a total organism, an attitude all too often lacking in the general hospital graduate. Such training means a graduate who is well fitted to care for the sick, and many of the graduates of this training school have been very successful general-duty nurses. Perhaps more important is the fact that these graduates furnish a supply of nurses for mental hospitals, a supply which experience has shown cannot be amply provided if the general hospitals are depended upon, even if affiliate and post-graduate courses are in operation, as is the case in this hospital. The opposition of the various nursing organizations and State boards of registration to the existence of 3-year training courses in suitably equipped mental hospitals is difficult to understand. The need of psychiatric training of the general-duty nurse is officially recognized (in the District of Columbia mental hospital affiliation is required of the general hospital training schools), and the desirability of raising the care of the mentally ill to general hospital standards is so patent as to be beyond argument. The existence of a training school, the presence of graduate nurses on the wards and the teaching activities of the staff all exert a stimulating action on the morals of the medical and nursing staffs and redound to the benefit of the patients. St. Elizabeths Hospital would be derelict in its duty to its patients and to its obligations to the community (in the present

state of nursing education, at least), if it did not attempt to operate a nurses' training school of standards equal to the best.

NEEDS OF THE HOSPITAL

An estimate of \$1,251,720 for the support, clothing, and treatment of the patients in St. Elizabeths Hospital for the fiscal year ending June 30, 1940, is recommended. This is \$69,120 more than was appropriated for 1939, and based on an average of 1,900 patients and on a 366-day year (1940 is leap year). On June 30, 1938, there were 1,894 patients. The average number during the year was 1,813.7. The number estimated in view of this fact seems very conservative. There was an increase of 301 patients in the hospital on June 30, 1938, as on the same date of the previous year, and it is conservatively estimated that the number to be provided for during 1940 will be 6,186.

In addition to the 1,900 chargeable to the Federal Government and authorized under the Interior Appropriation Act, the numbers who will be cared for in the hospital during the year 1940 are: 3,950 beneficiaries of the District of Columbia; 90 beneficiaries of the United States Veterans' Administration; 140 beneficiaries of the United States Public Health Service; 16 beneficiaries of the United States Soldiers' Home; and 90 beneficiaries of the Indian Bureau. The funds for the beneficiaries of the District of Columbia will be appropriated in the District of Columbia Appropriation Act; for the beneficiaries of the United States Veterans' Administration in the appropriation act for the United States Veterans' Administration; the beneficiaries of the United States Public Health Service will be carried in the appropriation of the United States Public Health Service; the beneficiaries of the United States Soldiers' Home will be paid for from United States Soldiers' Home funds; and beneficiaries of the Bureau of Indian Affairs will be paid for by transfer from funds appropriated for conservation of health among Indians.

The rate estimated for the care of the patients during 1940 is \$1.80 per capita per day, the same as for the past 4 years, notwithstanding the fact that there is some increase in the cost of supplies and that new legislation pertaining to vacation and sick leave and additional holiday has a tendency to increase the cost.

Included in the estimate is \$185,000 for repairs and improvements to buildings and grounds, the same amount that was included in the past several years. Out of this sum must come funds for keeping the various buildings in repair, including plumbing, heating, steam-fitting, plastering, glazing, painting, etc., and for the repair and widening of roads and walks.

The estimates for the fiscal year 1940 contain change of language in two places: The first adds, after the word "purchase" in the sentence, "including not exceeding \$27,000 for the purchase, ex-

change, maintenance, repair, and operation of motor-propelled passenger-carrying vehicles," the language "including one at not to exceed \$1,500." Under the law as it exists at the present time, there is a limitation of \$750 for the purchase of passenger-carrying vehicles. St. Elizabeths Hospital purchased a Cadillac limousine in 1926. This one has had 12 years of service and is practically without value. In order to convey the patients of the hospital who are mentally ill it is advisable to procure a larger car, preferably a limousine type, in order to separate these patients from the chauffeur. The small cars that can be purchased at a cost of \$750 would hardly be large enough for this purpose. Therefore, request is made to include the suggested language so that a larger car of the class named may be purchased.

Another change of language is the insertion of the following:

Provided further, That when specifically authorized by the Secretary, attendance at meetings or conventions concerned with the work of psychiatry, medicine, and other scientific subjects of interest to St. Elizabeths Hospital is authorized, to be payable out of this appropriation.

Similar language is included in other appropriation acts, namely, Education; in appropriations for various branches of the Department of Agriculture; and, we believe, in appropriations for many other Government agencies. Practically all the States have appropriations permitting the superintendents of the various State institutions to attend these meetings or conventions. It is for the best interests of the officers of the various institutions to attend these conventions where there are exchange of ideas and promulgation of new thought upon the advanced work of psychiatry.

The hospital continues to grow. The admissions seem to be increasing, and there is still a shortage of beds. Nine hundred and fifty beds should be provided to cover immediate needs and to include the replacement of the semipermanent group of buildings which were erected in 1918, with an estimated life of from 15 to 20 years. This semipermanent group which has 530 beds is in a more or less dilapidated condition and not thoroughly fireproof. The cost of repair is increasing, and the hazard from fire is considerable. I consider this recommendation a pressing urgent one.

The increase in population, 300, during the past year more than offsets additional beds previously authorized. At the present time the hospital has no available beds and it is necessary to put additional beds on various wards to take care of the new patients as received.

In a report of the National Resources Committee for May 1938, on The Problems of a Changing Population, it states as follows:

More than half the occupied hospital beds in this country are assigned to patients suffering from mental diseases. The social, economic, and medical

aspects of these diseases, whereof the causes are still largely unknown, are very serious. They deserve the most intensive study.

The report well states the future of mental institutions, and shows that provision must be made for additional beds, as well as for active research.

Two of the continuous-treatment buildings are to be located adjacent to the continuous-treatment kitchen where provision has been made for the preparation and service of food; dining rooms will have to be provided and a tunnel connection to the kitchen so that the food may be brought to the building. It is planned to have cafeteria service in the dining rooms attached to these buildings. The same condition applies to the three buildings that are suggested to replace the semipermanent group.

Based on bids received on the last buildings, it is believed that \$350,000 will be required for each of these buildings, which will have a slightly increased number of beds. The first buildings of this class erected contained 162 beds; the new buildings, it is estimated, will have 190 beds.

There is an estimate of \$140,000 for one additional 750-horsepower boiler with the necessary utilities. The hospital recently installed three 750-horsepower boilers, which were sufficient for its needs at that time. Space was left for an additional boiler, which would be required when the new buildings were erected. The growth of the hospital requires the additional boiler as soon as arrangements can be made for its erection.

Seven hundred fifty thousand dollars has been estimated for a building for storeroom, warehouse, laundry, and industrial shops, including preparation of plans and specifications, advertising, supervision of construction, and equipment. The present storeroom was built more than 30 years ago. Since that time the population has very nearly tripled, but no change has been made in the storeroom and warehouse. The present storeroom, with cold-storage equipment, is practically out of date and the storage facilities are insufficient to care for adequate quantities of current supplies. In order properly to house supplies that must be cared for and regularly issued to the various buildings and industries, all sorts of out-of-the-way places have been utilized. The basements of many buildings housing patients have been used for storing furniture. The District Fire Department properly objects to this procedure. It is difficult to give proper protection to articles in all classes of buildings, and there is possibility of shrinkage.

The hospital has a shoe-manufacturing department, with 2 employees and about 60 patients, which makes all of the shoes used in the institution except those purchased from personal funds of patients. A room under the detached dining room is used for that

purpose. The manufacture of shoes is increasing and more room is required. A proper place with sanitary working conditions should be provided, and it is contemplated to have space available in the new store and warehouse building when authorized.

When the present laundry building was erected, the total amount of material washed and laundered each year was about 3,000,000 pieces. This has increased until during the past year over 14,000,000 pieces were washed and laundered. It has outgrown the original building; small additions have been put on each side, but it is necessary to furnish more room. It is contemplated, if a new building is authorized, to make space at one end of the first floor of this building for the laundry. Such authorization is urgently recommended.

There is an estimate of \$950,000 to purchase farm land, to construct buildings to house patients who would work on the farm, to construct buildings to house employees, for the farm animals, including dairy, piggery, poultry plant, a building for pasteurizing milk, making ice cream, and other necessary farm buildings, including expenditures for the purchase of land, preparation of plans and specifications, advertising, and supervision of construction.

The hospital consists of four plots of land, in all about 800 acres. The last land purchased for hospital use was in 1891. At that time the hospital had about 1,500 patients, and over 600 acres were used for farm and garden purposes. The hospital, while originally isolated some miles from the center of the city, at the present time on account of the growth of the city and the use of various forms of traffic, is now adjacent to the city and is surrounded by a growing population. The dairy and piggery are in proximity to buildings occupied by patients, and the dairy is adjacent to Nichols Avenue, a thoroughfare running through this section of the city; both the dairy and piggery are the subject of a good deal of complaint on the part of the inhabitants of this section.

One part of the farm is located about a half mile from the main site, in what is known as Congress Heights. Certain groups have recommended that a portion of this ground be turned over to the National Capital Park and Planning Commission for playgrounds for children, and that another part be turned over to the District of Columbia for streets and roads. Parts of this same site have been taken by the city for widening streets. It will readily be seen that the hospital must oppose all taking of land until additional land is obtained.

Another plot of the hospital is about four and a half miles from Washington; a portion of it is on low land, sometimes under water.

It is believed desirable to obtain between 5,000 and 6,000 acres of land, to concentrate all farm projects in one place, increase the size of the dairy herd, the piggery, and the poultry farm, and build about

6 cottages, housing 40 patients each, on this site. This arrangement would permit an increased number of patients who would derive the therapeutic benefits of healthful outdoor occupation. This also would prove an economic arrangement in that the hospital would be able to secure sufficient milk for all purposes, to increase the quantity of pork products and probably to cure pork products, thus reducing the quantity of ham, bacon, and shoulder to be purchased, and also increase the quantity of poultry products, such as fowl and eggs.

The hospital has no site in view, but preliminary studies indicate that such a site could be secured within from 10 to 20 miles from the main plant.

STAFF CHANGES JULY 1, 1937, TO JUNE 30, 1938

The following appointments were made during the year:

Superintendent: Winfred Overholser. Date of taking office, October 4, 1937.

Psychiatric Residents: Irma H. Belk, Marion S. Love, Helen V. Patterson, Burnell V. Reaney, Josiah T. Showalter, and Charles E. Vigue.

Internes: David Brezin, Bernard A. Cruvant, John W. Thomas, and Sigmund Weiss.

The following resignations took effect during the year:

Assistant Medical Officer: Helen Yarnell.

Psychiatric Residents: Hack U. Stephenson, John M. Usow, Joseph T. Kaminskis, and Samuel Allentuck.

Internes: William F. Murphy, Arnold H. Ungerman, William H. Vicary, Moorman P. Prosser, Wallace E. Nissen, and Nathan N. Root.

PUBLICATIONS

Overholser, Winfred, Superintendent:

Later Criminal Careers, by Sheldon and Eleanor Glueck. (Book Review). Boston University Law Review, Vol. 17, No. 4, Nov. 1937, p. 924.

The Mentally Ill in America, by Albert Duetsch. (Book Review.) American Bar Association Journal, Vol. 23, No. 12, Dec. 1937, p. 982.

Legal and Administrative Problems, Mental Hygiene, Vol. 22, No. 1, January 1938, Page 20 (In Symposium, The Challenge of Sex Offenders).

The Early Treatment of Mental Disorders. (Presented before the Wayne County Medical Society, Detroit, Mich., April 27, 1938). (Mimeographed.) 23 pages.

Mental Hygiene and the Problems of Human Nature. (Address given under the auspices of the Mental Hygiene Committee, Michigan Medical Society, Detroit, Mich., April 27, 1938). (Mimeographed.) 10 pages.

The Rôle of Psychiatry in General Medicine. (Smith-Reed-Russell Lecture, Feb. 24, 1938). The Diplomat, Vol. 10, No. 5, May 1938. Page 164.

The Mental Hospital of Yesterday and Today. Medical Annals of the District of Columbia, Vol. 7, No. 5, May 1938. Pages 137-144.

Ten Years of Co-operative Effort. Journal of Criminal Law and Criminology, Vol. 29, No. 1, May-June 1938. Pages 23-36.

White, William A., (late Superintendent):

William Alanson White: The Autobiography of a Purpose. New York, Doubleday, Doran and Company, Inc. 1938. (Book, 293 pages). (Posthumous).

Karpman, Ben, Senior Medical Officer:

Crime and Adolescence. Mental Hygiene, Vol. 21, No. 3, July 1937. Pages 389-396.

"The Kreutzer Sonata": Problem in Latent Homosexuality and Castration. Psychoanalytic Review, Vol. 25, No. 1, January 1938. Pages 20-48.

Fong, Theodore C., Senior Medical Officer:

Study of Mortality Rate and Complications Following Therapeutic Malaria. Southern Medical Journal, Vol. 30, Nov. 1937. Pages 1084-1088.

Hoffman, J. L., Assistant Medical Officer:

Intercranial Neoplasms: Their Incidence and Mental Manifestations: Study Based on Clinical and Autopsy Records of 2,000 Patients of St. Elizabeths Hospital. Psychiatric Quarterly, Vol. 11, No. 4, October 1937. Pages 228-233.

Lebensohn, Z. M., Assistant Medical Officer:

Present Status of Metrazol Therapy of Schizophrenia. Medical Annals of the District of Columbia, Vol. 7, February 1938. Pages 33-41.

During the period of 7 months intervening between the death of Dr. White and the assumption of office by the present incumbent, Dr. Roscoe W. Hall, Clinical Director, served as Acting Superintendent. The affairs of the hospital were wisely administered by him during that interval, and he turned over to the present Superintendent a well-organized and well-running institution. I am deeply appreciative of his fine work in what must have been a difficult period. Nor can I pass without a word of tribute to Mr. Monie Sanger, Assistant to the Superintendent, who for nearly 33 years has handled most efficiently and ably the large bulk of administrative and budgetary detail of the institution.

It would be pleasing if I might express thanks by name to the many faithful and devoted employees and officers of the hospital whose loyal labors have contributed so greatly to the successful operation of the hospital, but space forbids. Saint Elizabeths Hospital is justly proud of its personnel and their fidelity to the welfare of the hospital and its patients.

The Board of Visitors has been most helpful and interested, and to them individually and as a group I express my appreciation of their support and assistance.

Finally, I desire to express to Secretary Ickes my deep appreciation of the trust he has reposed in selecting me to head a great hospital. His support and advice, whenever I have called upon him, have been prompt, firm, and most helpful. With the cooperation of the officers and employees of the hospital, and the continued support and assistance of the Board of Visitors and Secretary Ickes, it will be my endeavor to continue Saint Elizabeths Hospital in its present status as an object of justifiable pride to the Department of the Interior and the Government of the United States.

HOWARD UNIVERSITY

Mordecai W. Johnson, *President*

THE YEAR 1937-38 was the seventh of the 20-year program for Howard University approved by the Government. During this period two major buildings were under construction. The new library building, costing \$1,105,000, was nearing completion. The new men's dormitory building, costing \$525,000, is under construction, representing the first major effort to improve the living conditions of university male students since its founding. Funds for these projects were provided by the Federal Emergency Administration of Public Works.

Two additional divisions of the university receive accreditation.—During the year two additional divisions of the university were examined and accredited by leading educational authorities. The departments of engineering in the school of engineering and architecture were accredited after examination by the Educational Committee of the Engineers Council for Professional Development. The division of oral hygiene in the college of dentistry was accredited by the regents of the University of the State of New York.

Students.—During the year 1937-38 Howard University's enrollment increased 132. The total enrollment of 2,240 students was drawn from 42 States and 17 foreign countries. Of the 89 students entering the regular freshman classes in medicine, dentistry, law, and religion, 64 or 72 percent entered with college degrees. Two hundred and sixteen, or 71 percent of the 305 students in these 4 professional schools were degree-holding students. In the entire institution of 2,240 students 564 or 25.2 percent were persons holding one or more advanced degrees.

Further advance in clinical medicine.—By the help of funds from the General Education Board the department of medicine was reorganized under a full-time head. The department of surgery, reorganized under similar circumstances, during the previous year, greatly increased the efficiency of its work, reducing its mortality from 6.5 to 0.03 percent.

A postgraduate course in venereal-disease control was introduced and supported by a grant of \$7,500 from the United States Public

Health Service, in order to train physicians in venereal-disease control, particularly in the Southern States. Two grants totaling \$1,000 were made to encourage investigation and testing of tuberculosis.

The graduate school.—The graduate school enrolled 326 students during the year, an increase of 42 over 1936–37. The rapid development of high schools in the South and the accrediting movement of high schools and colleges by the Southern Association of Secondary Schools and Colleges have increased the demand for teachers with graduate training. Young State colleges have been urged to establish graduate work when most of them are still in need of adequate resources for their college work. The Association for Colleges and Secondary Schools for Negroes, at its annual meeting in New Orleans, was concerned that there should be no widespread movement toward the hasty establishment of graduate work in institutions not prepared to do it well. The General Education Board undertook a study of all the factors involved. It was found that six institutions were already undertaking graduate work in some form. Howard University is the oldest of these institutions in the development of graduate work, the largest in point of enrollment, and the most advanced in the matter of resources for further development. It stands out as the most promising center for graduate instruction in the entire field.

During the current year graduates from 59 institutions came to Howard University for graduate instruction, 83 percent of them from the South. It is of the utmost importance to many States that steps be taken to place the graduate work of Howard University on a sound and competent basis. Such a development can mean much to the Negro race.

Faculty publications and research.—The faculty of the university during the current year put forth 8 books, 78 scientific and scholarly articles, and 26 book reviews. Among these contributions was the continuous publication of the Journal of Negro Education, now one of the ablest publications in the United States in the field of education. Much of the research and publication of the faculties has significant practical bearing upon the life of the people. The department of pharmacology, for example, has discovered through careful research that picrotoxin, which was formerly considered merely a laboratory curiosity, is an efficient antidote for what would otherwise be a fatal poisoning by the barbiturates, now in widespread use as sleep-producing drugs. As a result of the department's research in this field picrotoxin has received international approval as the best known available drug to combat poisoning by the barbiturates.

Outstanding needs of the university.—The outstanding needs of the university, made increasingly clear by the work of the year, were: (1) An increase in the number of teachers in the graduate school and in the clinical branches of medicine; (2) an increase of 26 in the number

of mature teachers of professorial rank; (3) the sum of \$100,000 to make important supplements to the gravely deficient book collection in our library; (4) the doubling of funds for scholarship and student aid, especially for teachers in the South, who may not otherwise find it possible to pursue the graduate work which they need to increase their efficiency; (5) proper organized relationship with the Freedmen's Hospital so as to enable the school of medicine to operate on a sound basis; and (7) increased funds for at least that minimum of research which is necessary to maintain a living mind in the members of the teaching staff.

STUDENTS

University enrollment, 1937-38.—The total enrollment of Howard University (see table following) for the year 1937-38 was 2,240, of whom 1,119 were men and 1,121 were women, as compared with an enrollment of 2,108 for 1936-37, of whom 1,108 were men and 1,000 were women. This enrollment represents a net gain of 132 students, or 6.2 percent. It represents also a total gain of 614 students since the low point of the depression in 1933-34.

Summary of Students Enrolled in Howard University for the Years 1937-38 and 1936-37

Division of the university	Net enrollments						Total gain	Total loss
	1937-38			1936-37				
	Total	Men	Women	Total	Men	Women		
THE COLLEGES								
College of liberal arts.....	1,332	586	746	1,244	593	651	88	
School of engineering and architecture.....	50	50	0	52	52	0		2
School of music.....	98	31	67	75	28	47	23	
Graduate school.....	326	121	205	284	110	174	42	
Total.....	1,806	788	1,018	1,655	783	872	153	2
PROFESSIONAL SCHOOLS								
School of religion.....	23	20	3	21	21	0	2	
School of law.....	74	72	2	70	68	2	4	
School of medicine:								
College of medicine.....	154	142	12	139	133	6	15	
College of dentistry.....	48	41	7	38	38	0	10	
College of pharmacy.....	29	29	0	31	26	5		2
Total.....	328	304	24	299	286	13	31	2
Total in regular courses.....	2,134	1,092	1,042	1,954	1,069	885	184	4
Special students in music, religion, law, dentistry.....	130	38	92	162	44	118		32
Total.....	2,264	1,130	1,134	2,116	1,113	1,003	148	
Less duplications.....	24	11	13	8	5	3	16	
Grand total (net).....	2,240	1,119	1,121	2,108	1,108	1,000	132	

The increase in enrollment affected all three of the major divisions of the university, undergraduate, graduate, and professional. An increase of 15 appeared in the college of medicine. This is the first

substantial increase in the enrollment of medicine since the beginning of the depression.

Geographical distribution.—Of the regular students enrolled for the school year 1937–38, 95.5 percent came from the continental United States and 4.1 percent from without the borders of the United States. The percentage of students coming from the District of Columbia was 25.2 percent.

Forty-two States sent 2,047 candidates for degrees in 1937–38 as compared with 40 States sending 1,871 candidates for degrees in 1936–37. The regional distribution of candidates for degrees is as follows: From the North, 509 students as follows: New England, 58; the Middle Atlantic States, 302; the East North Central States, 101; the West North Central States, 48. From the South, 1,525 students as follows: The South Atlantic States, 1,263; the East South Central States, 151; and the West South Central States, 111. From the West, 13 students as follows: Mountain States, 4; Pacific States, 9.

Sixteen foreign countries sent 87 candidates for degrees during the school year 1937–38 as compared with 15 foreign countries with a total of 83 candidates for degrees in 1936–37. As usual, the largest group of foreign students (44) came from the British West Indies. Nine came from the Virgin Islands, eight from British Guiana, and eight from Panama.

Students of graduate caliber.—Two of the professional divisions, namely, pharmacy and dental hygiene, receive students on the basis of regular college entrance requirements. Medicine, dentistry, law, and religion require definite amounts of college work. Of the 89 students entering the regular freshman classes of medicine, dentistry, laws and religion in 1937–38, 64 or 72 percent, entered with college degrees. Two hundred sixteen, or 71 percent, of the 305 students in these four professional schools are degree-holding students. Of the 2,240 students in the entire university 564, or 25.2 percent, are persons holding one or more advanced degrees as compared with 429, or 23 percent, in 1936–37.

Scholarships and student aid.—Scholarships within the university continued to be administered on the basis of an allotment of 7½ percent of all student fees, as provided by the trustees of the university.

The committee on scholarships and student aid acted upon 1,250 applications for assistance. Four hundred forty-five students, or 19.4 percent of the student body, were awarded tuition or work scholarships. Of these 204 were helped by the National Youth Administration, at an average of \$112.22 per student. The total amount available for scholarships from all sources was \$59,995.65.

Concerning the 1,250 applications for assistance the chairman of the general committee of scholarships states that "about 2 percent

of the applicants were judged by the committee as being not in sufficient financial need to receive aid from the university. More than 98 percent of the applicants are in need of aid in order to enable them to attend Howard University. Even those assisted by this committee receive as a rule, only a portion of their university expenses. It is clear that Howard University must find additional aid for needy students."

GRADUATES

Number and distribution.—The following table exhibits the number of graduates from each division of the university during 1937-38. It shows that there were 250 graduates. These came from 31 States and the British West Indies. The total of 250 students graduating in 1937-38 represents an increase of 24 graduates as compared with the 266 in 1936-37. There were 134 male graduates and 116 women graduates as compared with 127 and 99 respectively, for the year 1936-37.

Honorary degrees.—Three honorary degrees were conferred at commencement in June 1938. The degree of doctor of music was conferred upon Marian Anderson, contralto, Philadelphia, Pa.; and the degree of doctor of laws, upon Dwight Oliver Wendell Holmes, President of Morgan College, Baltimore, Md., and J. R. E. Lee, President of Florida A. and M. College, Tallahassee, Fla.

Total number of Howard University graduates.—The total number of graduates of Howard University is now 10,266. Of this number the registrar has over 6,000 correct addresses in 43 States, the District of Columbia, and 15 foreign countries, classified alphabetically by States, cities, sex, schools, and classes.

Summary of Students Graduated by Howard University for the Years 1937-38 and 1936-37

Divisions of the university	Graduates					
	1937-38			1936-37		
	Men	Women	Total	Men	Women	Total
THE COLLEGES						
College of liberal arts.....	54	82	136	44	64	108
School of engineering and architecture.....	4	—	4	1	—	1
School of music.....	3	3	6	1	2	3
Graduate school.....	21	24	45	12	24	36
Total.....	82	109	191	58	90	148
PROFESSIONAL SCHOOLS						
School of religion.....	6	—	6	7	—	7
School of law.....	14	1	15	15	2	17
School of medicine:						
College of medicine.....	22	—	22	34	1	35
College of dentistry:						
4-year course.....	7	—	7	11	—	11
Dental Hygiene.....	—	6	6	—	5	5
College of pharmacy.....	3	—	3	2	1	3
Total.....	52	7	59	69	9	78
Grand total (net).....	134	116	250	127	99	226

THE TEACHING STAFF

Objectives.—In the development of the 20-year program, the trustees of the university have kept in mind several major objectives in relation to the teaching staff. (1) Their first objective has been to increase the number of teachers so as to establish the proper ratio between teachers and students. (2) They have undertaken to increase the number of full-time teachers and gradually to shift the major responsibility for instruction in every division of the university upon the shoulders of teachers giving their full-time attention to the work of education. (3) The establishment of a salary scale for each rank of instruction, assuring a minimum income of a definite amount to each teacher in that rank and moving toward such an average for that rank, and especially for the rank of professor, as will enable the teacher concerned to devote his full time and attention to his work. (4) Advancements in rank and salary on the basis of merit objectively determined. (5) The gradual maturing of the staff of the university so as to have in the topmost rank of professors and constituting at least 40 percent of the entire group of teachers of the university, mature men and women of sound scholarly habits. (6) The establishment and publication to the administrative and teaching staff of sound tenure regulations, so as to afford administrative officers and teachers a sense of security in their positions, and so as to make clear the conditions under which the presumption of permanent tenure may be established. (7) The setting up of retirement regulations on the basis of which administrative officers and teachers of the university having arrived at a certain age, may be assured of retirement with a substantial proportion of their annual income available thereafter. (8) the provision of competent educational assistants, adequate equipment and supplies to enable the teacher to use his intellectual powers to the maximum advantage. (9) The maintenance of freedom of teaching.

No one of these major objectives has been neglected. Substantial progress has been made in relation to each one of them.

There were 258 members of the teaching staff for 1937-38, of whom 148 were full-time teachers and 110 were rendering part-time service, representing together a full-time equivalent of 166.43 teachers. In 1928, when the trustees began to put the 10-year program into operation, there were 161 teachers in the university, 81 of them being on full-time service and 80 on part-time service. It will be seen that during the intervening period the total number of teachers has been increased by 60 percent and the total number of full-time teachers has been increased by 76 percent. This means that the teaching load in the college of liberal arts, for example, has been reduced by one-half, so that each student may now receive approximately twice as much of the teacher's time as in 1928. It means, further, that 90 percent

of the work of instruction is now done by teachers who are devoting their full time to education.

There are three major points of strain in the university at which the number of teachers now at work is insufficient. These are (1) the graduate school, (2) the clinical branches of medicine, and (3) the school of religion. The latter, of course, must be met from private sources.

The maturity of the staff.—On the basis of the 20-year program, the present staff of Howard University should have the following distribution: Professors (40 percent) 66; associate professors (10 percent) 16; assistant professors (20 percent) 33; instructors (30 percent) 49. The university is slightly beyond the halfway mark in the number of mature professors. Twenty-six such men and women are now needed. The choosing and appointment of these 26 persons, by advancement and outside selection, constitute the most important work now waiting to be done at the university.

Faculty publications.—One of our professors in the college of liberal arts has made a careful study of the scholarly productions of that faculty over a period of years, showing in brief that they have published 56 books and monographs, 469 articles and papers, 141 book reviews, and 86 other creative contributions, such as poetry, plays, paintings, etc. This is a highly favorable picture. In the discussion of his result, however, the writer makes the following significant comment:

It should be kept in mind that it has only been within the last 10 years that the teaching load in the college has been sufficiently reasonable to allow time and energy for scholarly productivity. At the present time, for example, the average teaching load is 222.5 clock hours as compared with a load twice as heavy 10 years ago. The reduced teaching load is reflected in the fact that approximately 85 percent of the contributions made by teachers during their tenure at Howard have been produced during the past 7 or 8 years.

The publications of the university faculty during the year 1937-38 were as follows: 8 books, 78 scientific and scholarly articles, 26 book reviews.

The practical bearing of faculty research.—In the department of pharmacology one member of the staff has been interested in research on the action of barbiturates (a large family of sleep-producing drugs). Within recent years the drug market has been flooded with sleep-producing drugs belonging to this family. In many States these drugs may be bought without prescription. During the past few years such drugs have been widely used in suicide attempts. Also, cases of accidental poisoning have resulted from their use. This member discovered that picrotoxin, which was formerly considered merely a laboratory curiosity, is an efficient antidote for what would otherwise be a fatal poisoning by the barbiturates. As a result of

his research in this field, microtoxin has received international approval as the best known available drug to combat poisoning by the barbiturates. The antidote is now available on the market for this purpose.

THE GRADUATE SCHOOL

General trends.—The graduate school continued the unbroken trend of increased enrollment which it has sustained since 1929–30 throughout all the years of the depression. This has been the most significant enrollment development in the university during these years. It has been accompanied by an equally significant movement of steady increase in the number of students of graduate caliber registered in the major professional schools of the university.

This steady increase in graduate enrollment has been of a national character. This year the students came from nearly three-fourths of the States of the Union. While the students have come predominantly from colleges and universities established for Negro youth, they have increasingly come also from many of the long-established colleges and universities in the North and West.

Two major developments designed to have a very helpful effect upon the graduate work appeared during the year. The new library building is about finished and will be ready for occupancy during the first semester of 1938–39. It will provide graduate reading rooms, seminar rooms, and cubicles for individual study in the stacks. The new men's dormitories, now under construction, are so arranged as to permit an entire section to be set apart for graduate students.

Enrollment.—The total enrollment of graduate students for the year 1937–38 was 326. This represents a net increase of 42 students over the enrollment of 284 students in 1936–37. One hundred ninety-six of these students were registered in the first semester, 218 in the second semester, and 88 in the summer school. One hundred twenty-one of the total were men and 205 were women.

An average of 76 of these students were giving their full time to their studies, that is, from 12 to 15 and more semester hours of work during the first and second semesters of the regular school year. There was an additional average group of 78 students who were giving half-time and more to their graduate studies as compared with 52 such students during the preceding year. Altogether the graduate enrollment represented a full-time equivalent of 233 students, as compared with 24 students in 1936–37.

Sources of students.—The 326 graduate enrollment came from 32 States and 1 foreign country. It will be seen that 272, or 83 percent, came from the Southern States.

These students received their first degrees from 59 colleges and universities before coming to Howard University. Twenty institutions in Northern and Western States sent 31 students as compared with 20 institutions in Northern and Western States sending 22 last

year. These institutions include some of the charter members of the Association of American Universities. Thirty-seven institutions for Negro youth sent 295 students, or 90 percent of the entire enrollment. Thirty-four of the students held master's degrees as compared with 23 and 7 the 2 previous years. Seven professional degrees were listed among the students, and one doctor of philosophy.

Department of instruction and faculty.—The 326 students for the year 1937-38 did their work in 18 departments of instruction. One hundred thirty-eight, or 42 percent, of the students in the graduate school did their work in education, psychology, and philosophy. Ninety, or 27 percent, did their work in the social sciences of economics, sociology, social work, history, and political science. Thirty-eight, or 11 percent, did their work in the natural sciences, in mathematics, including bacteriology, botany, zoology, chemistry, and physics. Fifty-two, or 15 percent, did their work in English, German, and romance languages.

Seventy-two teachers participated in graduate instruction during the year.

Social work.—Social work was undertaken for the first time in the academic year 1935-36, under the direction of the department of sociology. There were 24 students enrolled in 1935-36; 28 in 1936-37; and an average of 34 for the current academic year. The publication of a special bulletin of the department of social work is to be issued during the coming year. Plans for the development of medical social work have been undertaken by the department.

Degrees conferred.—At commencement 45 graduate degrees were conferred on 18 men and 27 women. Thirty-five received the degree of master of arts and 10 the degree of master of science. The number indicates an increase of 9 in the group of graduates over the year 1936-37.

The future of graduate work.—The rapid development and accreditation of public high schools and colleges for Negroes in the States of their majority residence within the last 10 years have created an acute and growing need for mature teachers with thoroughly competent training on the graduate level. The soundness of the educational structure throughout these States depends primarily upon the calibre of graduate instruction which is made available to meet this situation.

Howard University is the most promising center for such graduate work in the entire area. The steady increase in the enrollment in the graduate school from 43 in 1926-27 to 284 in 1936-37 is an index both of the rapidity with which the need has developed and of the remarkable opportunity which now confronts Howard University in this field. It is of the utmost importance to the States of the Negro's majority residence that all possible steps now be taken to place the graduate work at Howard University on a sound and thoroughly

competent basis so as to enable the university to select and to train on the graduate level young men and women of unusual promise. In such a program certain immediate steps are urgent: (1) The book collection of the university should be doubled within a period of 5 years; (2) special scholarship and fellowship funds for graduate students should be provided; (3) funds should be available for at least the minimum of research necessary to the staff who teach graduate students; (4) salaries of the mature teachers on the staff of the university should be so increased as to enable them to give their entire time to their work without worry; and (5) the number of such mature, well-paid teachers should be immediately increased.

THE COLLEGE OF LIBERAL ARTS

Enrollment.—The college of liberal arts enrolled 1,332 students in 1937–38. This is the largest enrollment in the history of the college. It represents an increase of 88 over the enrollment of 1936–37, and an increase of 176 in the enrollment of 1934–35, which was the first year of the merger of the college of education with the college of liberal arts. These students were at work in 24 departments of instruction.

The students in the college came from 38 States and the District of Columbia and from 12 foreign countries.

The graduates.—The graduates of the college of liberal arts for 1937–38 numbered 136, as compared with 109 in the previous year.

The faculty.—There were 88 members of the faculty of the college officially in service during the academic year 1937–38. Of these, 81 were full-time teachers and 7 were on part-time.

The following significant facts about the faculty of liberal arts are taken from a study made during 1937–38 by Dr. Charles H. Thompson, head of the department of education:

(1) Of the 21 full professors, 70 percent have the doctorate degree, or more, and no full professors possesses less than 2 years of graduate training.

(2) Of the 15 associate professors, 9, or 60 percent, have 2 or more years of graduate training; and only 1 (an art teacher) has less than 2 or more years of graduate training.

(3) Of the 19 assistant professors, 8, or 42.1 percent, have doctorate degrees; 7, or 36.8 percent, have two or more years of graduate training.

(4) Of the 29 instructors, 28, or 97.6 percent, have 1 or more years of graduate training—the median training being the master's degree with additional graduate training.

(5) Taking the faculty as a whole, 39.7 percent have doctorate degrees, or more; 75.8 percent have 2 or more years of graduate training; and the only persons (three) who do not have some formal graduate training are the special cases already noted.

(6) The members of the faculty of the college of liberal arts have put forth 752 scholarly publications, including 56 books and monographs, 469 articles and papers, 141 book reviews, and 86 other creative contributions such as poetry, plays, paintings, etc. Eighty-five percent of the contributions made by teachers during their tenure at Howard have been produced during the past 7 or 8 years.

Faculty publications during the year 1937-38 included 5 books, 2 chapter contributions to books, 47 articles published in scholarly periodicals, and 24 book reviews.

MILITARY SCIENCE AND TACTICS

Enrollment.—The enrollment of the department of military science and tactics during the current academic year was 329 the first semester and 323 the second semester, as against 215 and 312 respectively for the last year. Forty-seven students from Howard University attended the R. O. T. C. camp at Fort Howard, Md., June 12 to July 23, 1937, and all students successfully completed the course.

Unit rated as excellent.—Colonel Richard Wetherhill inspected the R. O. T. C. unit May 23 to May 27, and attended its R. O. T. C. Day on June 3, 1938. His report is as follows:

General rating of the unit—"Excellent."

Credits allowed.—By vote of the faculty of the college of liberal arts, the advanced courses in military science and tactics will hereafter receive $1\frac{1}{4}$ hours of academic credit per semester. The basic courses continue on a par with physical education and receive no academic credit.

Commissions awarded.—Ten students were awarded commissions as second lieutenants of Infantry, Officers Reserve Corps, United States Army. Four additional students will receive certificates of eligibility for commissions as second lieutenants of Infantry, Officers Reserve Corps, upon attaining 21 years of age.

THE SCHOOL OF ENGINEERING AND ARCHITECTURE

Accreditation.—In October 1937 the departments of engineering were accredited by the Engineers' Council for Professional Development and placed on the list of nationally recognized schools of engineering.

Enrollment.—Instruction was given to 75 students, 50 of whom were enrolled for degrees in engineering and architecture. Three-fourths of the students were from areas outside of the District of Columbia.

Graduates and their employment.—Four students were graduated in June 1938, three from the department of civil engineering and one from the department of mechanical engineering. One student was graduated with honors. Two students were employed immediately upon graduation. Graduates receiving work appointments during the year included one instrument man for a municipality, a supervising engineer for a state engineering department, a division engineer for a municipality, a tool designer for a manufacturer of aeroplane parts, a construction engineer, engineer inspector and power plant engineer, and a manager for a federal housing project. One graduate was appointed to a teaching position in a land-grant college.

Faculty.—The faculty of eight full-time members included one professor, one associate professor, one assistant professor and five instructors. There were four visiting lecturers during the school year. One faculty member was on sabbatical leave of absence for post graduate study. Eighty-five percent of the faculty have earned the master's degree or its equivalent, while one member has earned the degree of doctor of philosophy.

Two thirds of the faculty are registered professional engineers or architects. A number of the faculty members hold Civil Service status with high classification.

One faculty member applied for a patent on an optical miller, a device which already had attracted the interest of tool manufacturers.

New equipment.—Through a special grant from the Government, several important pieces of laboratory equipment, including a steam turbogenerator set, Diesel engine, air-conditioning unit, a theodolite and a precise level, were acquired.

Needs.—Additional laboratory apparatus is needed for developing the work in electronics, materials testing, and power plant science. Three new teachers in engineering and architecture are necessary for relief regarding the heavy teaching loads and for developing courses in power plant operation and institutional maintenance. The departmental housing facilities are inadequate for present enrollment, which is double the normal capacity of the building. A new building designed for engineering and architecture should be acquired at an early date.

SCHOOL OF MUSIC

Number and distribution of students.—The school enrolled 222 students during the year, as compared with 223 for the previous year. Ninety-eight of these students were registered in the regular degree courses. One hundred and twenty-four were registered in the junior department. These numbers represent an increase of 23 in the regular degree courses. This is the largest enrollment of students prepared to pursue degree courses in the history of the school of music. By reason of the vigorous development of the enrollment in degree courses the numbers in the junior department during the current year were restricted. It is the purpose of the school to continue this restriction and to focus its attention on the selection of students of outstanding musical talent capable of developing in a limited time to the conservatory level.

Faculty.—There were 16 members of the faculty during the year, as compared with 13 last year. Ten of these gave full time to the work, while six others gave the full-time equivalent of two teachers. No major appointment was made during the year. One member of the faculty is on leave and is now appearing at the Drury Lane Theatre in London, England. Four members of the faculty appeared in 14

recitals in 13 States. Two members of the faculty are engaged in advanced study.

Graduates.—Six students were graduated at commencement time. One received the degree of bachelor of music; five received the degree of bachelor of school music.

Outstanding events of the year.—The concert series this year was an outstanding success. The series was unusually well attended and was well managed so as to yield a net income of \$1,330 as a basis for the series of the coming year.

The theory department presented its second annual recital of original music composed and performed by students, on a much larger basis than last year and in a much wider scope.

Five students of the school of music held positions as organists and directors of church choirs during the current year. Twelve of them held recitals in places other than Howard University.

The glee club rendered eight recitals over the radio, made four trips to other cities, and gave the second recital at the White House.

SCHOOL OF MEDICINE

The school of medicine is the functional organization which represents the cooperative interests of the entire medical unit of the university without superseding the direct authority from the independent faculties to the board of trustees. The autonomous member units are the college of medicine, the college of dentistry, and the college of pharmacy. Freedman's Hospital, an independent institution built upon grounds owned by the university, is functionally a part of the university medical unit.

COLLEGE OF MEDICINE

Outstanding events of the year.—(1) Decided progress in the re-organization of the medical and surgical services in the Freedman's Hospital, and in the improvement of the teaching of medicine and surgery under supervision of full-time professors and heads of the departments, made possible by grants from the General Education Board and the Rockefeller Foundation. (2) The introduction of a post-graduate course in venereal disease control supported by a grant of \$7,500 made available from the Social Security funds by the United States Public Health Service. The course was given by the college of medicine in cooperation with the United States Public Health Service, the Health Department of the District of Columbia, and Freedmen's Hospital. The course was designed primarily to train select Negro physicians, particularly in the southern states. (3) The board of trustees approved the establishment of the E. A. Balloch student loan fund, to serve as a revolving loan fund providing small, short-time loans to medical students. (4) A grant of \$600 was given by the National Tuberculosis Association to be used by the head of

the University Health Service for the purpose of stimulating interest, nationally, in the health of Negro college students with special reference to tuberculosis. (5) The general surgical mortality of the Freedmen's Hospital during the past 2 years has been reduced from 6.5 percent to 0.03 percent. (6) Responsibility for the university health service was placed on the dean of the school of medicine. The work of the year was carried through with a high degree of efficiency. (7) The conducting of the tuberculosis case findings program among freshmen students made possible by a grant of \$400 by the Tuberculosis Association of the District of Columbia. (8) The addition of nine assistant residents to the house staff of Freedmen's Hospital.

Students.—Of a total of 212 applicants, 171 presented minimum premedical requirements for admission. Thirty-five freshmen were admitted. The greatest number of medical students registered at any time during the year was 139.

During the year the school of medicine furnished instruction to 298 students, distributed as follows: Medical students 133; students in dentistry 34; dental hygiene 7; pharmacy 29; nurses 42, and post-graduates in venereal disease control 25, making a total of 260.

Instruction was also given by the staff in mental hygiene and public health to graduate students in sociology and social work.

The degree of doctor of medicine was conferred upon 22 graduates at the June commencement all of whom have secured internships in hospitals approved by the Council on Medical Education and Hospitals of the American Medical Association.

Fifty-nine Howard medical graduates were examined by 13 State boards in the United States during the year. Fifty-four passed and five failed. The percentage of failures was 8.5%.

Faculty.—Of a total official faculty of 111, 26 were full-time teachers and 85 were part-time. There was a full-time equivalent of 37.12 persons on the faculty of the college.

One General Education Board fellow in surgery has reported to the College of Physicians and Surgeons of Columbia University for graduate study; one General Education Board fellow is completing the study of neuro-psychiatry at the University of Iowa. Three associate professors were advanced to the full professorial rank in the departments of pathology, bacteriology, and biochemistry. There have been 20 scientific publications by members of the faculty during the year.

COLLEGE OF DENTISTRY

General trends.—There was another increase in the enrollment in the college of dentistry during the year 1937-38, continuing the slow but steady increase apparent since 1934. The outlook for 1938-39 is very encouraging. The department of oral hygiene was accredited by the regents of the University of the State of New York and en-

couraging progress was made in the placement of graduates in this new field of work at the university.

Enrollment.—Forty-one students registered for the year 1937-38 as compared with 38 for the year 1936-37. The oral hygiene enrollment of 7 made a total enrollment of 48. At the last meeting of the committee on admissions, 21 new applicants were approved for admission in 1938-39. This is the best outlook for a freshman class that the dental college has had in several years.

The accreditation of oral hygiene.—Our department of oral hygiene was accredited by the regents of the State of New York and the accrediting registration was dated back to include the first year of operation by the department.

Seven students were enrolled during the year. The faculty has set a registration of 10 as the maximum number to be admitted for the time being.

Very satisfactory progress has been made in the placement of our graduates in oral hygiene. In 1937-38, one graduate was appointed in the District of Columbia public schools; another was appointed as hygienist in the Veterans Hospital of Tuskegee, Ala.; another was appointed in the Sea View Hospital in New York, and still another was appointed in the private office of one of our successful graduates of Columbus, Ohio.

Improved equipment.—Five new units and six dental chairs were installed in the college of dentistry, and provisions made for a new X-ray unit.

Improved clinical performance.—The clinical classes this year earned an average of \$359.32 per student as compared with \$154.56 per student in 1929-30. While it is impossible to measure student performance in terms of dollars and cents, the enriched experience gained from extensive achievement in the clinical specialties forms a helpful measuring rod for professional capacity.

Graduates.—At the commencement season, six graduates were awarded the degree of doctor of dental surgery and six received certificates in oral hygiene.

University health program.—In cooperation with the program of the university health service, the college of dentistry has extended its service by way of complete oral diagnosis of students in medicine and dentistry and of all freshmen throughout the university.

Faculty.—There were 13 members of the faculty during the year, 11 of whom were giving full-time work while 2 were giving part-time service equivalent to 1 full-time teacher. Two members of the faculty were on sabbatical leave, doing work toward the degree of master of science in dentistry. There were three advances in rank during the current year.

COLLEGE OF PHARMACY

General trends.—With the discontinuance of the college of pharmacy at Meharry Medical College, the Howard University College of Pharmacy stands entirely by itself in Negro pharmaceutical education.

Registration.—There were 29 students registered for all classes at the beginning of the year, 2 of whom were women. Twelve were freshmen or beginning students, seven sophomores, five juniors, and four seniors.

Graduates.—Three graduates in the college of pharmacy received the degree of bachelor of science in pharmacy. This was the third class to graduate from the bachelor of science or 4-year course in pharmacy, adopted in 1932.

Faculty.—The faculty for the year 1937–38 was the same as the faculty of 1936–37, with two full-time professors, two instructors, full-time, and one instructor part-time. One instructor was on leave of absence without pay for the second semester, to pursue his studies for the doctorate degree at the University of Minnesota.

Student health.—The college of pharmacy has cooperated during the year with the university student health service in filling prescriptions written for students and furnishing the various medical prescriptions required. One hundred twelve prescriptions were filled during the 5-month period from January to May. Almost without exception, exclusive official United States Pharmacopoeia and medical formulary preparations were prescribed.

SCHOOL OF LAW

General trends.—The procedural course which previously has been given only in the first year has been extended to cover both the first and second years, and administrative law, labor law, and civil rights have been added to the curriculum for the first time. There is a definite tendency to raise the standards for admission to the bar. Especially is this noticeable in the District of Columbia, where the Bar Association has recommended that 2 years of prelegal work be required as a condition of admission to the bar.

Enrollment.—The enrollment for this year was larger and better equipped scholastically than at any previous time in the history of the school. Seventy-six students were in attendance from twenty-six States and two foreign countries. The enrollment has doubled within the last 4 years. Forty-seven of our seventy-six students have the bachelor's degree, and one has the master's degree. Thirty-nine colleges were represented in the enrollment—25 of these colleges for the education of Negro youth.

Twenty-one, or 77.8 percent, of the 27 entrants in the first year class possessed 4 years or more of college training.

Graduates.—Sixteen graduates received the degree of bachelor of laws at commencement. This is three times the number awarded degrees in 1936. Of 15 graduates, 1 had his master's degree and 11 had the bachelor's degree before they entered the school. All except two had more than the minimum prelegal requirement of 60 hours of college work.

Faculty.—The staff for the last year was increased by one assistant professor. We now have five full-time and four part-time persons on the faculty, distributed as follows: Professors, 1; associate professors, 1; and assistant professors, 3; all full time. Part-time staff: 2 assistant professors, 1 professor, and 1 lecturer.

The library.—The number of volumes now in the library is 19,478; received on purchase 421; received as gifts, 36; added as bound periodicals, 49; different periodical titles received on purchase, 36; different periodical titles received as gifts, 24; total circulation of books 1937-38, 4,810; total circulation of books 1936-37, 3,647; increased circulation of books, 1,163. The library was under the supervision of one part-time librarian.

Official inspection.—The president of the American Association of Law Schools visited our school of law during the year and, after thorough inspection, recommended that the school secure one additional stenographer, one additional full-time teacher, and one full-time library worker.

SCHOOL OF RELIGION

Financial support.—The school of religion received no aid from Federal funds. Its work is maintained entirely by endowments and private gifts. Two legacies approximating \$2,000 each became available during the current year.

General trends.—For 5 years our school of religion has been on a graduate basis, allowing only college graduates to matriculate. Since 1932 there has been an increase of 500 percent in the number of graduate students. The question as to whether a school of religion entirely devoted to the education of students of graduate calibre could succeed, is answered in the affirmative.

Enrollment.—In the first semester of the year 1937-38, 29 students were enrolled in the school of religion. During the second semester there were 32 students enrolled. This represents an increase from 9 college graduates in 1933-34 to an average of 30 in 1937-38.

The school has been interdenominational from its beginning. The present student body is drawn from six denominations, including the Congregational, the Baptist, the Methodist Episcopal, the colored Methodist Episcopal, the African Methodist Episcopal, and the African Methodist Episcopal Zion denominations. The student body this year came from 21 colleges.

Graduates.—Nine students were graduated from the school of religion June 10, 1938. Six received the bachelor of divinity degree and three received the master's degree in religious education. All graduate work is consolidated under the graduate school. For this reason the master's degree in religious education is given by the graduate school and not by the school of religion.

Faculty.—There was one new full-time appointment to the faculty. The faculty consisted of nine members, including three full-time professors, one part-time professor, and five part-time instructors.

Dr. W. Y. Bell, professor of old testament interpretation and Hebrew, was elevated to the highest office of his church—the bishopric. His position will be difficult to fill.

Library.—The school of religion library now contains 2,396 volumes. This represents an increase of 296 volumes over last year. At least 5,000 volumes are necessary for the minimum adequate functioning of the school.

Outlook and needs.—The dean expects 18 new students to matriculate in the fall. This will place the enrollment at 47 persons, or 10 short of the maximum to be achieved within the next 3 or 4 years. The quality of work done for the B. D. degree is being rapidly improved. The university is giving careful consideration to the problem of finding suitable quarters for the school of religion and is making effort to secure supporters for an increased faculty, increased scholarship funds, and a substantial addition to the book collection.

THE LIBRARY

Approaching completion of new building.—The approaching completion of the new library building has greatly increased interest in the work of the library. Further progress has been made in organizing the staff for efficient service in the new home.

Library organization and administration.—The library is now organized in 6 departments with 12 assistants. An average of 28 students worked in the main library during the year on university and N. Y. A. scholarships.

Library departments' progress.—Acquisitions department reports 4,954 items accessioned, representing 2,514 items by purchase, 1,583 by gift, 477 by binding, 38 by exchange, and 342 acquired by school of medicine. Large gifts were received from the Ministry of French Foreign Affairs, the estate of Myra T. Spaulding, Mrs. Josiah T. Settle, and Teachers College Library, Columbia University.

The serials division added 113 new titles, bringing its current titles received to 570 with a periodical issue circulation of 1,410.

A total of 4,250 titles and 4,842 books were cataloged.

The circulation and reference division issued 2,652 identification cards, reported a circulation of 70,489 books for reserve and nonreserve books and bound periodicals.

The Moorland Foundation fulfilled 2,688 recorded book requests, added a total of 299 items and filed about 10,000 cards in its special catalogs, files, and indexes. The librarian gave lectures on library usage to all freshmen. The system of interlibrary loans was expanded, so that 445 items were requested for Howard, while 26 requests were received from other schools.

Special projects.—With W. P. A. assistance, the union catalog of material by, on, and relating to the Negro was begun, an official subject headings list for our card catalog made a reality, and nearly 8,000 unaccessioned items listed and arranged in acquisitions room.

Statistics (total).—The total number of books now accessioned in the university libraries is 111,801. The main library handles 570 of the 808 periodical titles received and is responsible for 74,587 of the entire circulation. Total circulation reported as 132,481 for 1937–38.

BUILDINGS AND GROUNDS

Buildings under construction.—The following table shows the list of building projects in process during the year ended June 30, 1938. These buildings were constructed under funds and direction of the Federal Emergency Administration of Public Works.

Building Projects in Process, Year Ending June 30, 1938

No.	Description of project	Date authorized	Total appropriations
5	Construction and equipment of a library building.....	Feb. 14, 1931	\$1, 105, 000. 00
8	Construction and equipment of a heat, light, and power plant.....	Feb. 17, 1933	555, 576. 99
9	Construction and equipment of dormitories for men.....	Oct. 4, 1935	525, 000. 00

The status of the above listed projects as of June 30, 1938, was as follows:

Project No. 5.—Construction and equipment of a library building. Exterior walls and roof completed; interior work nearing completion. Expected to be ready for occupancy during the first semester of 1938–39.

Project No. 8.—Construction and equipment of heat, light, and power plant. Tests completed and plant put in use throughout the school year 1937–38.

Project No. 9.—Construction and equipment of dormitories for men. Second group of bid proposals exceeded the appropriation. Contract let for central unit and two of four wings. Walls halfway completed. Application pending for funds to complete the project as originally planned.

FINANCES

Assets —The total assets of the university at June 30, 1938, were \$9,174,836.41, exclusive of the unexpended balances of Government appropriations for the chemistry building; the heat, light, and power plant; the library; and the men's dormitories. Of the total assets, the sum of \$1,201,425.70 represents assets in the physical plant exten-

sion fund, made possible through private gifts of the General Education Board and the Julius Rosenwald Fund, and from rentals of the property purchased by the gifts of these funds; \$1,031,401.46 represents endowment (an increase of \$71,807.92); \$6,807,837.87 represents plant fund assets (an increase of \$829,600.74 since the report of June 30, 1937) exclusive of the unexpended balances of Government appropriations for buildings, as indicated above. One thousand three hundred twenty-eight dollars and thirty cents represents a small loan fund for students in the school of medicine. The remaining \$232,842.32 represents assets of the current fund.

Income and expenditure.—The total income for the year 1937–38 was \$1,911,755.22, including current and capital funds. This represents a gross increase of \$484,313.91 over the total income for 1936–37. This increase is due primarily to an increase of \$474,382.25 in the income from previously appropriated Government funds for buildings. The total income for current purposes during 1937–38 was \$1,124,283, representing an increase of \$8,931.66 over the current income for 1936–37. Of the total income for current purposes the Government contributed \$699,824.76 or \$19,459.94 less than the Government contributed for 1936–37. The income for current purposes from private sources increased from \$396,066.64 in 1936–37 to \$424,458.24 in 1937–38.

Attention is respectfully directed to the fact that during the year 1937–38 the endowment of the university passed the million dollar mark, and that there was an increase of \$60,867.70 or 4.29 percent in the amount of money spent for resident instruction.

Balanced budget.—Again as during the school year 1936–37, the budget of Howard University was kept at balance, the income exceeding the expenditures by \$236.56. This sum was applied to the retirement of the accumulated deficit.

The audit of funds.—The auditing of all the university's accounts has been done by certified public accountants. All moneys appropriated by the Congress and by the Federal Emergency Administration of Public Works were expended under the supervision of the Secretary of the Interior. The accounts involving these funds have been inspected by the Government accounting officer and have been found to be satisfactory.

APPRECIATION

On behalf of the trustees, faculties, and students of Howard University, I wish to express to the Secretary of the Interior and through him to the Members of the Congress and to the President of the United States my appreciation for their thoughtful and constructive interest in Howard University, and to all the officers and employees of the Department of the Interior for their courtesy and helpfulness in handling the affairs of Howard University.

FREEDMEN'S HOSPITAL

Dr. T. Edward Jones, Surgeon in Chief

FREEDMEN'S HOSPITAL, in addition to affording an opportunity to the young Negro to perfect himself or herself in the field of medicine or in training for nurses, affords a competent center for the treatment of human ills. Hospital facilities in many communities being inadequate for the colored man, Freedmen's Hospital continues to receive approximately 50 percent of its patients from the States, distant as well as nearby.

For the first time, the professional staff of the hospital, in keeping with regulations governing other members of the American Hospital Association, was during the year graded according to rank resultant upon experience and ability. The installation of modern intercommunicating equipment, with a minimum expenditure, added to the efficiency of operation. The number of internes was reduced from 24 to 16, effective July 1, 1938. In their stead, eight assistant residents were appointed. These assistant residents have already served a 1-year internship. They are closely associated with the internes following them, and in addition to improving their own professional ability, act as a guide to their less experienced followers.

This system serves a twofold purpose. It gives added assurance of proper patient care and at the same time affords an opportunity for the young physician to spend from 1 to 3 years in hospital training.

Those who show superior qualifications are eligible for appointment as residents, the sequence being interne, assistant resident, and resident.

TRAINING SCHOOL FOR NURSES

At the beginning of our administration, we found ourselves faced with an edict from the Nurses' Examining Board of the District of Columbia of a cancelation of registration of our training school for nurses, effective September 1, 1938. Upon our appeal to the office of the Secretary of the Interior, Miss Virginia Livesay, R. N., was assigned to Freedmen's Hospital as technical adviser on nurse administration for a period of 6 months. In consequence of her survey, reorganization of the school, and institution of a modern program for nursing procedures, the Nurses Examining Board of the District of Columbia, in response to our request under date of August 1938, informed us that our registration would be continued until September

1, 1939, and assured us if we paralleled our progress as of today, our registration would be still further extended. This means that additional graduate nurses, hospital attendants, and equipment must be secured.

We cannot commend too highly the excellent work done by Mr. Richard Mackenzie, hospital consultant, and Miss Virginia Livesay, technical adviser on nurse administration.

N. Y. A. AND W. P. A. PROJECTS

The N. Y. A. project within the hospital has offered an excellent opportunity for the Negro youth to fit himself for helpful service in the advancement of health. They learn much with reference to proper housekeeping in regard to the sick, as well as the attention which must be given. The hospital, in return, derives some benefit from their services rendered.

One W. P. A. project installed July 1, 1938, is rendering valuable aid assorting, assembling, and filing our old records. Another W. P. A. project is giving material help in our efforts to keep the hospital at a high standard of cleanliness.

CONCLUSION

With a sympathetic understanding and cooperative attitude upon the part of the Secretary of the Interior and others, Freedmen's Hospital finds itself gradually emerging from its pauperism. It was necessary to request a deficiency appropriation of \$10,000 in order to keep the hospital doors open for the last 6 months of the fiscal year 1937, and a deficiency appropriation of \$15,000 for the fiscal year 1938.

Feeling that there might be an error in judgment upon the part of the Chief Surgeon as to the needs of the hospital, as well as a possibility of inexperience in hospital management, a request was made upon the Secretary of the Interior for a survey to be made by a hospital expert. The request was granted, and Mr. Richard Mackenzie made the survey. His findings justified our budget estimate and revealed that we were altogether too modest in our requests. As a result, a supplemental budget of \$196,500 was submitted for the fiscal year beginning July 1, 1938. Of this supplemental budget \$50,000 was appropriated by Congress, along with a \$15,000 deficiency appropriation for the fiscal year ending June 30, 1938. This increased appropriation will go a long way toward improving the efficiency of the hospital.

We still need 30 graduate nurses, 42 hospital attendants, 4 laboratory helpers, 1 pathology laboratory technician, 1 assistant pharmacist, 4 assistant social service workers, 1 assistant dietician, 8 junior clerk typists, 4 messengers, 6 guards, 3 elevator operators, 5 electrician helpers, 6 cooks, 4 kitchen helpers, 2 gardeners, and 4 laundry workers.

There also should be an increase in the maintenance appropriation to meet the increased daily census.

COLUMBIA INSTITUTION FOR THE DEAF

Percival Hall, President

DURING the fiscal year ended June 30, 1938, there were under instruction in the advanced department of the institution, known as Gallaudet College, 82 men and 52 women, a total of 134, representing 39 States and the District of Columbia. This is a decrease of seven as compared with the preceding year.

In the primary and grammar department, known as the Kendall School, there were under instruction 32 boys and 41 girls, a total of 73. This is a decrease of one as compared with the preceding year. Of the total in this department 70 were admitted as beneficiaries of the District of Columbia.

There were admitted to the institution 28 males and 23 females; discharged, 17 males and 15 females.

HEALTH

Excellent health has prevailed during the year, with no serious surgical cases and no cases of a dangerous contagious disease.

COURSES OF INSTRUCTION

Instruction in architectural drawing was resumed. A special course was given in statistics and their graphical representation. A course in principles of teaching, begun last year, was continued. The rest of the curriculum remained the same.

NEEDS OF THE INSTITUTION

Special needs of the institution at the present time are new buildings: First, a combined library-recitation building, for which over \$60,000 has been given to the institution by friends and alumni of the college department; second, addition to the present laboratory building; third, addition to the gymnasium for basketball; fourth, new units for the Kendall School, consisting of new dormitories, school building, and two new cottages for resident instructors.

RESEARCH WORK

A research problem in connection with the simplest and most understandable means of communication with deaf students has been in progress under the direction of Prof. Sam B. Craig, with the aid of

funds supplied by the National Research Council. During the year appropriations have been made for the coming year for a regular research worker, and a number of problems, such as the study of the language of deaf pupils compared with that of hearing pupils, employment of the deaf in the District of Columbia, and particular studies of sight and hearing of pupils of the institution, are contemplated.

SEVENTY-FIFTH ANNIVERSARY

Invitations were extended during the year for the alumni of the college department to celebrate the seventy-fifth anniversary by a special meeting in June at Kendall Green. The regular meeting of the Conference of Executives of American Schools for the Deaf has also agreed to meet in Washington in October 1939, in connection with this celebration of the seventy-fifth anniversary of the opening of the collegiate department.

SPECIAL GIFTS

Special gifts were received during the year from Thomas S. Marr for a scholarship, and from Mrs. Olaf Hanson for an annual prize in memory of Dr. Hanson.

RECEIPTS AND EXPENDITURES

The total United States appropriation for the fiscal year was \$145,000, of which \$141,745 was expended. Special current funds were received to the amount of \$47,289.71, with expenditures of \$43,924, leaving a balance of \$3,255 to be returned to the Treasury of the United States from the appropriation and a balance of \$3,365.71 in special funds to be carried into the new fiscal year.

PRESENTATION DAY

At the close of the school year, seven graduates of the normal department received the degree of master of arts in course, eight students of Gallaudet College received the degree of bachelor of arts in course, and five the degree of bachelor of science in course. The honorary degree of master of letters was conferred upon Howard Leslie Terry, of California, deaf author and former student of the college; and honorary master of pedagogy upon Winfield Scott Runde, of California, graduate of the college retiring from the teaching profession after many years of successful service.

INDEX

A

	Page
Additions to National Park System.....	vii
Appropriations:	
Geological Survey.....	166-167
Indians.....	263
Mines, Bureau of.....	206
National Park Service.....	41
Vocational Education.....	339-343
Arts and crafts, Indian.....	233-234
Alaska, natives, health work.....	242-244
Alaska, Railroad.....	274-275
Alaska, Road Commission.....	275
Alaska, Territory of.....	273-275
Alaska, work of Geological Survey in.....	127, 134-140
All-American Canal.....	82

B

Baker Island.....	280
Blue Ridge Parkway project.....	22
Board on Geographical Names.....	371
Bonneville project.....	84
Boulder Canyon project.....	ix, 56, 80
Burlew, Ebert K., First Asst. Secretary.....	xvii

C

Cadastral Engineering Service.....	88
Canton Island.....	280
Cases, Division of Investigation.....	358-359
Central Valley project.....	ix, 54
Changes in park system.....	27
Charters, Indian.....	251-253
Chesapeake & Ohio Canal.....	3, 15
Civilian Conservation Corps.....	33, 49, 74, 89
Education activities in.....	320-324
Division of Grazing activities.....	114-116
Indian Division.....	220, 222, 227-229
Coal, research in.....	179-181
Colorado-Big Thompson project.....	ix, 56
Columbia Institution for the Deaf.....	417-418
Concessionaires, national parks.....	23
Connally Act.....	360
Conservation:	
Branch of Geological Survey.....	157-168
Department, change of name.....	xvii
Education in.....	353
On Indian lands.....	217, 227-229
Of Indian forests.....	217
Mineral, program for.....	174
Unified forest policy for.....	122
Water supply studies.....	145-156
Wildlife protection program.....	117-118
Cooperatives, Puerto Rico.....	287
Coos Bay wagon road grant lands.....	90
Credit fund, Indian.....	250-253
Crop results, reclamation projects.....	66

D

Deaf, Columbia Institution for the.....	417-418
---	---------

E

East Texas oil area.....	361-364
Education:	
C. C. C. activities.....	320-324
Conservation.....	353
Office of.....	xiv, 294-356
Federal activities in.....	299-305
Forum demonstrations.....	308-310
General Board of, report.....	355-356
Legislative needs for.....	349-350
Indian adult.....	246-247
Information Service.....	315-317
Land grant colleges and universities.....	317-318
Library work.....	310-311
President's Advisory Committee on.....	346-348
Public school enrollment.....	295
Publications, Office of.....	343-345
Radio broadcasting.....	306-308
University cooperation.....	311-312
Vocational.....	324-343
Vocational, appropriations for.....	339-343
Electrification, Rural, Puerto Rico.....	288-289
Elk Hills oil case.....	iii-v, 264
Enderbury Island.....	280
Equatorial and South Sea Islands.....	280
Exhibits, Office of.....	368
Expenditures:	
Geological Survey.....	166-167
Mines, Bureau of.....	207-208

F

Federal Buildings.....	35, 46
Federal Radio Education Committee.....	313-314
Federal Range Code, Foundation of.....	110-111
Federal Tender Board, No. 1.....	361
Fire prevention, national parks.....	17
Foreign minerals, study of.....	198-199
Forests:	
Conservation on Indian lands.....	217
Director of.....	xiii, 122-124
Fire statistics.....	42
Protection, national parks.....	17
Puerto Rico.....	293
Forum, educational demonstrations.....	308-310
Freedmen's Hospital.....	415-416
Fuel, development of, research in.....	174

G

Gallaudet College, Columbia Institution for the Deaf.....	417-418
General Education Board, report of.....	355-356
General Land Office.....	87, 106

	Page		Page
Geographical Names, Board of.....	371	Indians—Continued.	
Geological Survey.....	x, 125-172	Reclamation projects.....	223
Geological Survey:		Roads.....	232-233
Conservation Branch, work of.....	157-163	Self-government.....	247-250
Work in Alaska.....	127	Social Security.....	237-238
Year's activities.....	126	Tribes.....	213-217, 220, 248-252
Grand Coulee Dam.....	III, IX, 54	Tuberculosis among.....	238
Grazing Act.....	87	Vocational education.....	245-246
Grazing Districts, Enforcement in.....	118-119	Information, Division of.....	366
Grazing Districts, Status of.....	110	Information Service, Education.....	315-317
Grazing, Division of.....	107-122	Investigations, Division of.....	356-359
C. C. C. work in.....	114-116	Irrigation and crop results.....	67
Organization of.....	110	Islands, Equatorial and South Sea.....	280
Grazing licences, number of.....	107		
Grazing program.....	xIII		
		J	
H		Jarvis Island.....	280
Hawaii, Territory of.....	275-277	Jeanes, Anna T. Educational Fund.....	356
Hawaiian Homes Commission.....	277		
Helium.....	x	K	
Helium, production of.....	188-189	Kendall School, Columbia Institution for the	
Historic American Buildings Survey.....	22	Deaf.....	417-418
Historic sites and buildings.....	15		
Homestead entries.....	97	L	
Health:		Land grant colleges and universities, Federal	
Alaska natives.....	242-244	activities in.....	317-318
Indian.....	238-242	Legislation, need for educational.....	349-350
Indian tuberculosis.....	238	Libraries in education.....	310-311
Puerto Rico.....	285-286		
Hospitals:		M	
Freedmens.....	415-416	Maps, work of Geological Survey on.....	140-145
Indian.....	241	Mine safety work, accomplishments in.....	173
St. Elizabeths.....	373-394	Mineral leases and mining claims.....	98
Housing:		Mineral withdrawals and classifications.....	103
Indian.....	230-232	Minerals, foreign, study of.....	198-199
Urban, Puerto Rico.....	292	Mines, Bureau of, report of.....	IX, 173-208
Howard University.....	395-416	Motion Pictures, Division of.....	367
Buildings and grounds.....	413	Muir, John.....	3
Finances.....	413-414	Museums.....	13
Graduates.....	399		
Students.....	397-399	N	
Teaching staff.....	400-402	Natchez Trace Parkway.....	22
Howland Island.....	280	National Capital parks.....	25
Hurricane Research, Puerto Rico.....	292	National Park Service.....	1
		Additions to system.....	VII
I		Blue Ridge Parkway project.....	22
Ickes, Harold L., Secretary, letter to Presi-		Changes in system.....	27
dent.....	III	Buildings space control.....	37
Indians.....	XI	Chesapeake & Ohio Canal.....	3, 15
Adult education.....	246-247	Concessionaires.....	23
Affairs, Office of.....	209	Federal buildings.....	35, 46
Appropriations.....	263	Fire protection.....	17
Arts and crafts.....	233-234	Forest protection.....	17
Credit fund.....	250-253	Historic American Buildings Survey.....	22
Education.....	244-247	Historic sites and buildings.....	15
Employment.....	257	Olympic National Park.....	2
Exhibits.....	234	Park attendance.....	1
Grazing, livestock and income.....	219	Proposed monuments and parks.....	31-32
Health.....	238-242	Regionalization of parks.....	5
Hospitals.....	241-242	Sugar pines.....	VI
Income.....	229-230	Travel Bureau.....	7, 8, 34
Land irrigation.....	221-224	Negro education.....	297
Land, mineral development on.....	161	Negro Affairs, Office of Adviser on.....	369-370
Population.....	257-261	Negro Schools, Jeanes Fund for.....	356

	Page		Page
O			
Office of Exhibits.....	368	Roads, Indian.....	232-233
Office of Adviser on Negro Affairs.....	369-370	Rockefeller, John D., Jr.....	vi
Oil, shipments by water.....	364	Rum, Virgin Islands.....	279
Olympic National Park.....	v, 2	S	
Oregon & California lands, forest policy in....	122-123	St. Elizabeths Hospital.....	373-394
P			
Park attendance.....	1	Secondary investigations, reclamation.....	71
Patient population, St. Elizabeths.....	371-375	Self-government, Indian.....	247-250
Petroleum Conservation Division.....	360-365	Slattery, Harry, Undersecretary.....	xvii
Pineapple industry, Hawaiian.....	276	Solicitor, Office of.....	264-269
Population, Indian.....	257-261	States control.....	37
Population, reclamation projects.....	63	Statistics, Geological Survey.....	166-172
Potteries, Puerto Rico.....	287	Sugar, Puerto Rico.....	286-287
Proposed national monuments.....	32	Sugar, Hawaiian.....	276
Proposed national parks.....	31	Sugar pines.....	vi
Public lands, minerals, oil and gas on.....	159-161	Social Security, Indian.....	237-238
Public lands, withdrawals of.....	94	T	
Public schools, enrollment in.....	295	Taylor Grazing Act, receipts from.....	91
Publications, Office of Education.....	343-345	Territories and Island Possessions, Division of.....	xvi, 273-280
Puerto Rico.....	277-278	Travel Bureau.....	7, 8, 34
Puerto Rico Reconstruction Administration.....	281	Tuberculosis among Indians.....	238
Puerto Rico rehabilitation.....	xvi	U	
R			
Radio, educational broadcasting.....	306-308	Universities, Federal educational cooperation.....	311-312
Raker Act.....	v	University, Howard (<i>see also</i> Howard University).....	395-416
Reclamation, All-American Canal.....	82	V	
Boulder Canyon project.....	ix, 56, 80	Virgin Islands Co., the.....	279-280
Bureau of.....	51	Virgin Islands, the.....	278-280
Central Valley project.....	ix, 54	Vocational education.....	324-343
Construction program.....	53	Vocational education, appropriations for.....	339-343
Colorado-Big Thompson project.....	ix, 56	Vocational education, Indians.....	245-246
Crop results on projects.....	66	W	
Grand Coulee Dam.....	iii, 54	War minerals relief cases.....	264
Indian projects.....	223	Water power, Geological Survey, studies on.....	158-159
Financial status.....	75	Water resources, studies of.....	145-156
Population on projects.....	63	Wildlife conservation, Division of Grazing program.....	117-118
Secondary investigations.....	71	Wildlife management.....	13
Reclamation fund.....	58	Y	
Reconstruction Administration, Puerto Rico.....	281	Yellowstone Lake.....	6
Recreational demonstration area.....	33	Yosemite, School of, Field Natural History.....	12
Regionalization, national parks.....	5		
Rehabilitation, Indian.....	230-232		
Rehabilitation, rural, Puerto Rico.....	282-284		
Repayment Commission.....	viii, 60		
Revested Oregon & California lands.....	90		
Rights of way.....	98		



NATIONAL LIBRARY OF EDUCATION



3 6533 00227810